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ABSTRACT

This guide is intended to serve as a resource for business education instructors who are teaching a course in information processing for the automated office. The following topics are covered: program goals, student learning objectives for production applications, an introduction to production applications, a curriculum outline, student learning objectives and competencies for machine dictation and transcription, a curriculum outline for machine dictation and transcription, student learning objectives and competencies for word processing, definitions of key terms, a word processing curriculum outline, and evaluation criteria. Appendixes that comprise three-quarters of the document include an information processing glossary, dictation learning activities and a grading scale, office productivity standards, sample proposals, selected lists of publications and resource materials, and discussions of professional leadership/development, applying technology in office automation and telecommunication, and integrating office automation concepts into business education classes. (MN)

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INFORMATION PROCESSING APPLICATIONS

CURRICULUM GUIDELINES

Dr. Frank B. Brouillet
State Superintendent of Public Instruction

Janet L. Carlson
Assistant Superintendent
Vocational-Technical and Adult Education Services

Jay Wood, Administrator
Program Development Section

Dr. Mari C. Shaw, Program Specialist
Business Education and Project Director

Dr. Lois Petersen, Project Coordinator
for Guidelines Writing Committee
Western Washington University

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COMMITTEE MEMBERS

Dianne Kane	Clark County Skills Center 12200 Northeast 28 Street Vancouver, WA 98682 (206) 256-6079
Janet McCutcheon	Columbia High School Route 2, Box 278 White Salmon, WA 98672 (509) 493-1970
Dr. Lois Petersen Project Coordinator	Business Education Department Western Washington University Bellingham, WA 98225 (206) 373-7891 SCAN 532-3900
Patricia Smith	Tri-Cities Area Vocational Center 5629 Metaline Kennewick, WA 99336 (509) 735-8790
Dr. Mari C. Shaw	Business Education Program Specialist and Project Director Old Capitol Building, FG-11 Olympia, WA 98504 (206) 753-5647 SCAN 234-5647

FOREWORD

Purpose of the Project

The purpose of the project was to produce a guideline for the delivery of Information Processing Applications. The course content outline addresses both the development of psychomotor skills and conceptual learning relative to the new and emerging technologies impacting the automated office.

This project should serve as a resource for Business Education instructors who are teaching a vocational class representing a critical component of a Business Education Program.

The Committee Process

A statewide committee of teachers having expertise in the content area was formed to research course content, grading practices, student learning objectives, integration of higher order thinking skills and available resources to deliver instruction in Informaton Processing skill development through a secondary Business Education classroom. As a result of their efforts, this guideline became their product.

RECOMMENDATIONS

The committee recommends the following:

1. That this guideline be distributed to vocational directors/ administrators and Business Education departments in all Washington State school districts in May 1987.

2. That a statewide curriculum task force be appointed to review and revise this guideline every two years.

3. That the Washington State Advisory Committee for Business Education evaluate and provide for validation of the guideline prior to its next revision.

INTRODUCTION

To insure that Business Education students have exposure to the new and emerging technologies, it was felt necessary to revise the traditional second year of typewriting offered on the secondary level. Through the revision proces, the course was condensed to allow for the integration of updated skill and knowledges, addressing the demands of the marketplaces being served by entry-level employees. Curriculum materials considered obsolete or outdated were replaced with updated content.

As indicated in the suggested scope and sequence matrix that follows, Information Processing Applications is recommended for all students completing a Business Education track in Secretarial and Related (070601) and Office Services and Related (070701) series.

Course Title: Informaton Processing Applications 070710

Course Description: Information Processing Applications consists of three components--(1) Reinforced Skill Development/ Production Typewriting; (2) Machine Transcription/Dictation; and (3) Word Processing. The skill building/application component may be delivered on an electric or electronic keyboard; the word processing component must be delivered on a computerized keyboard. The transcription component integrates written and verbal communication skills.

Purpose of the Course: The purpose of this course is to provide advanced applications in keyboarding as well as to reinforce oral and written communication skills.

Course Level: Grades 11-12.

Course Length: One year--180 hours.

SUGGESTED SCOPE AND SEQUENCE

Accounting and Related (070101)

Keyboarding	180
Accounting	180
Elect. Math Applications	90
Micro. Applications	90
Business Communications	90
Office Procedures	90
(Info. Proces. Applic.)	(180)
*Coop. Office Ed.	360
(Accounting II)	(180)
(Business Law)	(90)
- - - - - - - - -	
(Shorthand I)	(90)

Secretarial and Related (070601)

Keyboarding	180
(Accounting)	(180)
Elect. Math Applications	90
Micro. Applications	90
Business Communications	90
Office Procedures	90
Info. Proces. Applic.	180
Shorthand I	90-180
Coop. Office Ed.	360
(Accounting II)	(180)
(Recordkeeping)	(90)
(Business Law)	(90)

Office Services & Related (070701)

Keyboarding	180
(Accounting)	(180)
Elect. Math Applications	90
Micro. Applications	90
Business Communications	90
Office Procedures	90
Info. Proces. Applic.	180
Coop. Office Ed.	360
(Accounting II)	(180)
(Business Law)	(90)
(Recordkeeping)	(90)
(Shorthand)	(90-180)

*Cooperative Office Education (180 hours, class; 405 hours on-the-job training) recommended -OR- a minimum of 90 hours of Office Procedures as closure to the program.

( ) = Suggested but NOT required for program completion

Note: In small districts with limited enrollment and staff, a comprehensive program may be delivered through a lab methodology or by scheduling various courses in alternating years. Contact the Business Education office at SPI for technical assistance in implementing or revising Business Education curricula: (206) 753-5647 or SCAN 234-5647.

GOAL

To be able to produce usable business documents on automated equipment from a variety of types of input and to be able to dictate business messages. The student will be expected to meet industry standards.

STUDENT LEARNING OBJECTIVES
(for Production Applications)

The information processing applications students will be able to:

1. Demonstrate the ability to meet industry speed and accuracy keyboarding standards.
2. Format and produce business messages in acceptable standard industry styles.
3. Format and produce commonly used business reports.
4. Format and produce tables and statistical applications.
5. Format and keyboard from oral instructions, standardized formatting instructions, simulated procedures manual instructions.
6. Compose simple documents at the keyboard.
7. Complete work under imposed stressful conditions.
8. Arrange information by judging the placement on the page.
9. Demonstrate professional development.

PRODUCTION APPLICATIONS

COMPETENCIES

The student will be able to:

1. Format and produce usable business documents.
2. Produce usable documents from oral or written instructions.
3. Compose at the keyboard.
4. Make judgment decisions.
5. Perform under imposed stressful conditions.

INTRODUCTION

Development of formatting capability will be accomplished by the student working through the following progression of activities:

1. Keyboarding from properly arranged, typewritten examples,
2. Keyboarding from unarranged material,
3. Keyboarding from handwritten draft,
4. Keyboarding from corrected copy,
5. Keyboarding from copy using proofreader's marks.

It is suggested that the teacher provide experiences for the student to produce work under the following conditions:

1. Interruptions - require student to move immediately to another assignment.
2. Prioritize work - require student to decide order of completion of work from notes attached to work indicating urgency of the assignment.
3. Rush assignments - require students to complete assignment by a designated time such that student is pressured to complete work.
4. Under timed conditions.
5. Production standards, i.e., a required number of usable documents within a given time for a specified grade.

CURRICULUM OUTLINE
(60 hours)

I. Skill Review (15 hours)

A. Speed drills

B. Accuracy drills

C. Basic written communication skills

II. Developing Formatting and Keyboarding Skills with Message Forms (10 hours)

A. Letters
1. Block (or modified block - depending on source used) style
2. Full block style
3. Simplified style

B. Memo and/or message reply memo

C. Envelopes

D. Telegraphic messages

E. Multiple-page letters

F. Special letter parts
1. Mailing notations, i.e., certified, registered, special delivery, airmail
2. Attention line
3. Subject line
4. Company signature in closing lines
5. Listed enclosures
6. Copy notation (pc)
7. Postscript
8. Document retrieval notation

III. Developing Formatting and Keyboarding Skills Using Tables and Statistical Applications (10 hours)

A. Multiple column documents

B. Column headings with statistical material
1. Headings longer than columnar material
2. Center under head by longest line in columnar material
3. Making decisions on what column head should be

*C. Table arranged long-way on page

*D. Multiple-page tables

*E. Other applications
1. Mailing lists
2. Rearranging material within table

IV. Developing Formatting and Keyboarding in Report Applications (10 hours)

A. One-page report

B. Multiple page report with special pages
1. Title page
2. Table of contents
3. End notes/bibliography
4. Page-end (explanatory) notes

C. Tables internal to the report

D. Bound forms
1. Left bound
2. Top bound

V. Developing Formatting and Keyboarding in Forms Application (5 hours)

A. Purchase requisition

B. Purchase order

C. Invoice

D. Mailing labels

E. Job application form

F. Postal cards

VI. *Developing Composition at the Keyboard Drill (5 hours)

A. Simple memo from instructions

B. Simple letter from instructions

C. Letter from a telephone message

D. Short manuscript from instructions

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VII. *Formatting and Keyboarding Special Report Forms (10 hours)

A. Minutes of meetings

B. Meeting agenda

C. Travel itinerary

D. Procedures manual

E. Legal applications
   1. Partnership agreement
   2. Power of attorney
   3. Simple family will

F. Medical applications
   1. Medical evaluations
   2. Medical forms

G. Procedures manual

VIII. Specialized Keyboarding Applications (10 hours)

A. Formatting from instructions in a procedures manual

B. Keyboarding using standardized formatting instructions

C. Keyboading material requiring editing decisions

D. Keyboarding material requiring formatting decisions

E. Placing materials on special purpose cards, forms, sheets

F. Referring to reference sources for information needed to complete document

IX. *Formatting and Keyboarding Employee Documents (5 hours)

A. Resume (data sheet)

B. Letter of inquiry

C. Letter of application

D. Application form

E. Interview follow-up letter

*OPTIONAL

MACHINE DICTATION AND TRANSCRIPTION

(60 HOURS)

STUDENT LEARNING OBJECTIVES

**Techniques and procedures will vary depending on the use of a typewriter or word processor.

The student will:

1. Demonstrate occupational ability to transcribe mailable documents from office-style recordings using a typewriter (electric or electronic) or word processor (microcomputer with program or standalone).
2. Dictate and record a variety of documents.
3. Describe the purpose and importance of dictation, machine transcription, and word processing in business.
4. Use proper English skills and proofread.
5. Summarize the importance of written communications in business.
6. Exercise appropriate work habits and traits.
7. Explain word processing career opportunities.
8. Describe an ergonomically designed work station.
9. Demonstrate leadership abilities.

MACHINE DICTATION AND TRANSCRIPTION COMPETENCIES

The student will be able to:

1. Describe the automated office environment in which dictation/transcription skills are used.
2. Transcribe on a typewriter or automated equipment mailable business documents.
3. Dictate business messages to a dictation unit applying good English skills.
4. Summarize the role of effective business communications in business.

CURRICULUM OUTLINE

(60 hours)

I. Professional/Leadership Development--ongoing with concepts integrated throughout the course. (5 hours)

- A. Work Habits and Traits
  - 1. Human Relations
    - a. Dependability
    - b. Self-Discipline
    - c. Attendance
    - d. Punctuality
    - e. Positive Self-Image
    - f. Safety-Conscious
    - g. Patience
    - h. Enthusiasm
  - 2. Business Ethics
- B. Organizational Skills
  - 1. Maintain an organized work area
  - 2. Set and progress toward goals
  - 3. Follow oral instructions
  - 4. Follow written instructions
  - 5. Utilize problem-solving techniques
  - 6. Handle work with interruptions
  - 7. Concentrate amid distractions
  - 8. Manage time

II. English Review (10 hours)

- A. Punctuation
- B. Capitalization
- C. Number Expression
- D. Usage
  - 1. Subject/verb agreement
  - 2. Sentence structure
- E. Word Division and Syllabication
- F. Abbreviations
- G. Plurals and Possessives
- H. Spelling/Vocabulary

III. Theory (5 hours)

A. Advantages of dictation/transcription equipment
1. Saves time and effort
2. Gets work processed quickly
3. Saves money
4. Increases productivity and efficiency
5. Makes better use of dictator's and transcriptionist's time
6. Is quickest method of capturing information
7. Is faster and easier to transcribe than longhand and shorthand
8. Easier to distribute workload

B. Disadvantages of dictation/transcription equipment
1. Training time of dictator and transcriptionist
2. Resistance of personnel to using equipment
3. No immediate contact between dictator and transcriptionist
4. Difficulty in transcriptionist understanding dictation

C. Types of dictation and transcription equipment
1. Portable dictation units
2. Desktop
3. Computer-Aided
4. Centralized Recording Systems
   a. Dictation terminal/phone
   b. Recorder
      (1) Endless loop
      (2) Cassette
   c. Transcription Machine
   d. Supervisor's Console
5. Cassettes
   a. Standard
   b. Micro
   c. Mini
   d. Pico (Made by Dictaphone)

D. Voice-Recorded Word Origination
1. Document
2. Notes, Ideas, Instruction
3. Phone-Recorded Messages

E. Work-Flow Procedures

IV. Transcription (20 hours)

A. Transcribing Skills
1. Listening--the ability to pay attention, concentrate, and understand that which is being said.

2. Language arts--the ability to use the English language correctly in written communication.
3. Keyboarding skills--the ability to rapidly and accurately record on paper whatever material is to be transcribed.
4. Editing--the ability to locate and correct any errors that occur during dictation and transcription.
5. Logical thinking skills--the ability to determine information that is needed or has been omitted, and whether the message is clear and logical.

B. Transcribing Techniques
   1. Develop a transcribing rhythm by:
      a. Listening to a group of words or a phrase, then
      b. Stopping the recording and
      c. Typing the group of words, then
      d. Depressing the foot pedal and listening again,
      e. Watching transcript instead of keyboard.
   2. Verify confusing items by:
      a. Listening closely to phrases or sentences that do not make sense;
      b. Listening to sentences that precede and follow confusing items; or
      c. Consulting dictator.

C. Transcribing Procedures
   1. Organize the work area and arrange material neatly on the desk. The following items are needed:
      a. Transcription unit (playback unit, headset, foot pedal control).
      b. Typewriter or computer and supplies (letterhead, plain paper, envelopes, correction devices).
      c. Reference books and materials (secretarial handbook, operator's manual for transcription unit, word division book, spelling software, dictionary).
   2. Prepare to transcribe
      a. Check to see that the unit, headset, and foot pedal are plugged in.
      b. Place recording medium in transcription unit.
      c. Turn on unit.
      d. Preview dictation:
         (1) Listen to first item to be transcribed from beginning to end.
         (2) Mentally punctuate material.
         (3) Make notes on the following items:
            (a) spelling of words needing dictionary
            (b) names needing verification
            (c) indistinguishable words needing clarification
            (d) special instructions

3. Adjust volume, speed, and tone controls.
4. Determine approximate length of dictation and set typewriter/computer margins accordingly.
5. Transcribe material according to priorities.
6. Proofread transcript before removing from typewriter or computer.
7. Clean work area:
   a. Turn off transcription unit
   b. Remove recording medium; file properly
   c. Cover machine at end of day
   d. Store supplies in appropriate place

D. Basic Machine Transcription Guidelines
1. Use standard letter placement format
2. Estimate margin sets; even margins
3. Use plain white paper for rough drafts; use letterhead or interoffice paper for final drafts
4. Use dictionary or spelling software for correct spelling and hyphenations of words
5. Use two-letter state abbreviations
6. Place the address of author immediately below the name in the closing lines for personal business letters
7. Type initials at end of each document
8. Proofread document; correct errors
9. Present document to author
10. Type final form from author's edited draft

V. Proofreading (5 hours)

A. Parallelism and consistency

B. Typographical errors
1. Transposed numbers
2. Transposed letters
3. Repeated letters or words
4. Omitted letters and words

C. Incorrect keyboarding, capitalization, hyphenation, usage of numbers, punctuation, and spelling

D. Inaccurate content

E. Standard proofreading marks

F. Awareness of proofreading/editing software and hardware aids

VI. Dictation Procedures (10 hours)

A. Dictation in the modern office

B. Recognition of kinds of dictation noting details

C. Dictation readiness and procedures
1. Organize self and message before dictation. Decide objectives; select points and organize to meet objectives. Make notes in the margins of letters; indicate new paragraphs by saying "new paragraph."
2. Indicate desired turnaround time.
3. Identify self.
4. Specify type of document being dictated.
5. Indicate whether rough draft or final copy form is requested.
6. Request desired number of copies.
7. List special instructions--spacing, format, envelopes.
8. Indicate commas by pausing, periods by dropping voice and pausing, and question marks by lifting voice and pausing. Do not dictate words "comma," "period," and "question mark."
9. Dictate "paragraph" between paragraphs.
10. Dictate the following punctuation marks: parenthesis, underscoring, semicolon, colon, hyphen, dash, quote, exclamation point.
11. Specify capitalization by saying "All caps" or "Initial cap" before word/phrase to be capitalized.
12. Spell proper names and unusual terms using the phonetic alphabet for any letters sounding similar.
13. Give name of dictator, personal title, address (personal business letter) for closing lines.
14. Specify end of dictation.
15. Say "Thank you" to the transcriber.
16. Maintain a steady, relaxed, normal conversation tone and use appropriate inflections and pauses. To not talk too fast; avoid mumbling, smoking, chewing gum, or eating while dictating.
17. Personalize dication. Remember, there is another person at the other end of the tape.

VII. Ergonomics (5 hours)

A. Furniture and fixtures

B. Hardware design

C. Office landscaping
   1. Work station efficiency
      a. Supplies
      b. Reference Materials
      c. Appropriate software
   2. Personalized area

D. Climate factors
   1. Temperature
   2. Humidity
   3. Air circulation
   4. Air quality

E. Lighting

F. Noise control

WORD PROCESSING

(60 HOURS)

STUDENT LEARNING OBJECTIVES

Word Processing tasks must be completed on an electric typewriter, microcomputer or word processing hardware.

The student completing the word processing component will demonstrate the ability to:

1. Produce business documents as mailable copy from rough draft, recorded, or handwritten as follows:

    a. Produce mailable sidebound, unbound, and topbound manuscripts with enumerations, special features, and bibliographies. Footnotes may be typed as end notes. Subscripts and superscripts should be included if software and printers support that output. Note: Word processing software may not support triple-spacing formatting in manuscript production.
    b. Apply the technical format requirements to produce mailable letters using block, semi-block, and simplified formats.
    c. Produce mailable statistical documents from unarranged copy. Students will be able to use the word processing functions to format documents.

2. Use the following word processing functions:

    a. search, find and replace
    b. block operations--move, copy, delete, read, write
    c. spelling check software
    d. margins
    e. underlining, bold print
    f. spacing
    g. justification
    h. paragraph tables, decimal tabs
    i. headers/footers

3. Recognize editing problems, research and solution through the use of reference manuals or dictionaries, and apply the information to produce mailable copy.

4. Proofread materials for errors, make necessary corrections and print out final copy.

5. Combine or transfer data between tapes or computer files, locate information on files and format disks, and make back-up copies when required.

6. Produce mailable forms, letters and mailing labels using merge capabilities.

7. Describe the word processing field and career progression.

8. Define a selected list of basic word processing concepts and terminology.

9. Exercise leadership skills through the ability to organize group activities, prioritize work schedules, set goals, and make independent decisions.

WORD PROCESSING COMPETENCIES

The student will be able to:

1. Produce mailable documents on a word processor.
2. Perform basic word processing functions.
3. Solve editing problems, correct errors located in proofreading, perform disk maintenance functions.
4. Describe the word processing field using appropriate concepts and terminology.

DEFINITION OF KEY TERMS

Formatting: Formatting is the process of determining the structure, i.e., margins, spacing, and placement, of a document for final presentation.

Mailable: The document must be correctly formatted and the intent of the content must remain intact. No misspellings, typographical errors, incorrect punctuation or incorrect syllabications are allowed. Omission of parts of the document make it unmailable.

Standard Line: A standard line is considered to be a 6-inch line.

Word Processing: The use of automated equipment, i.e., microcomputers or dedicated word processors, to record, edit, store, and revise correspondence, records, reports, statistical tables, forms, and other materials, using clerical skills and knowledge of word processing functions.

Word Processor: A word processor is a dedicated word processor or a microcomputer used as a word processor. It consists of a keyboard, central processing unit, a monitor, a printer and commercial word processing software.

CURRICULUM OUTLINE
Word Processing (60 hours)

I. Microcomputer Operations (5 hours)

A. Getting started
1. Power up computer
2. System hardware
a. Central Processing Unit
b. Monitor
c. Keyboard
d. Disk Drives
e. Printers
3. Load word processing software
a. Disk operating system
b. Program disk
4. Keyboard
a. Cursor movement keys
b. Function keys
c. Special keys (insert, delete, enter, escape, alt, control)
5. Exit program
a. Save files
b. Remove/store program disks
c. Power down/turn off computer

II. Word Processing Functions (20 hours)

A. Edit functions
1. Cursor movement keys
a. One character--left, right
b. One word--left, right
c. One paragraph--left, right
d. Entire file--beginning, end
2. Status line
a. Column
b. Line
c. Page
d. File name
3. Edit modes
a. Insert
b. Replace/overstrike
c. Wraparound
d. Hard carriage return
4. Delete functions
a. Delete character--left, right
b. Delete word
c. Delete line/sentence
d. Delete file

B. Special Editing Functions
   1. Block Operations (Cut and Paste Functions)
      a. Block markers
      b. Block commands, i.e., move, copy, delete, read, write
   2. Search/Find/Replace
      a. Global (entire document)
      b. Super (between documents)

C. Format Commands
   1. Margins
      a. Left/right
      b. Top/bottom
      c. Default settings
   2. Justification
      a. Centering text
      b. Left justification
      c. Right justification
      d. Full justification
   3. Hyphenation
      a. Temporary hyphens
      b. Required hyphens
      c. Hyphen help feature
   4. Line Spacing
   5. Tab Functions
      a. Paragraph tabs
      b. Decimal tabs
      c. Outline tabs
   6. Page Formatting
      a. Page breaks
         (1) Conditional page breaks
         (2) Controlled page breaks
      b. Page length
      c. Headers/footers
      d. Page numbering options
   7. Footnotes
      a. Superscripts
      b. Subscripts
   8. Print Features
      a. Bold
      b. Double strike
      c. Overstrike
      d. Underline

D. Printing Files
   1. Printer configurations
   2. Types of printers
      a. Dot matrix
      b. Impact (Daisy Wheel)
      c. Nonimpact (laser)

3. Printer Controls
   a. Off/on-line
   b. Friction feed
   c. Tractor feed
   d. Switch boxes
   e. Pitch size
4. Print Commands
   a. File designation
   b. Print Options
      (1) Number of pages
      (2) Print single pages
      (3) Stop print commands
5. Printer Problems
   a. Truncated print
   b. Paper feed problems
   c. Printer adjustments

III. Text Document Production (20 hours)

A. Standard Formats
   1. Letters
      a. Modified block
      b. Full block
      c. Simplified
      d. Form letters
   2. Reports
      a. Unbound
      b. Bound
      c. Memos
   3. Statistical Documents
      a. Placement--vertical/horizontal
      b. Use wp centering functions

Reference Manuals (5 hours)

A. Style Manuals

B. Dictionaries

C. Software Manuals

D. Proofreading
   1. Spelling check software
   2. Proofreader's symbols

V. Special Word Processing Applications (10hours)

A. Merge Functions
   1. Form letters
   2. Mailing labels
   3. Envelopes

VI. *Spreadsheets (5 hours)

A. System Structure
   1. Columns, rows, cells
   2. Labels, values
   3. Cell formatting
   4. Commercial templates

B. Edit Functions
   1. Titles
   2. Column, width
   3. Insert, delete
   4. Move, copy
   5. Clear screen

C. Formulas
   1. @Sum--ranges
   2. Basic math functions

D. File Management
   1. Save
   2. Load
   3. Delete

E. Create/Print Spreadsheet

VII. *Database Management (5 hours)

A. System Structure
   1. Fields
   2. Records
   3. Files

B. Edit Functions
   1. Insert, delete
   2. Move, copy
   3. Replace, search
   4. Modify fields/records

C. Format Functions
   1. Create/format data base report
   2. Design/enter data base entry form
   3. Data sorts
      a. Alphabetic
      b. Numeric
      c. Chronological

D. Special Data Base Applications
   1. Mailing lists
   2. Inventory
   3. Classroom list

*OPTIONAL FOR REINFORCEMENT

EVALUATION

Suggested grading scale for skill development timings (3-minute straight copy) for Production Applications section.

A	55+ wpm
B	50 - 54 wpm
C	45 - 49 wpm
D	40 - 44 wpm
F	39 or fewer wpm

Grading scales for production applications will vary according to the difficulty of the tasks. The following scales are suggested for documents produced on electronic keyboards for a 15-minute time period. (Assumes that all errors are corrected and that letters are average length and a mix of unarranged copy and handwritten draft.)

A	3 letters completed
B	2½ letters completed
C	2 letters completed
D	1 letter completed
F	Less than one letter completed

Statistical Report - 3-column tables with column headings, 12 items per column with one column being numbers. (Includes set-up time.)

A	20+ lines completed
B	15 - 19 lines completed
C	10 - 14 lines completed
D	6 - 9 lines completed
F	5 or fewer lines completed

Single- and multiple-page reports - 70 character line, handwritten draft, all errors corrected.

A	2½ pages completed
B	2 pages completed
C	1½ pages completed
D	1 page completed
F	Less than one page completed

Machine Transcription Production Grading Scale (One half-hour timing)

A	3 letters completed
B	2½ letters completed
C	2 letters completed
D	1 letter completed
F	Less than one letter completed

Mailability Standards

4 points	Perfect letter
3 points	Mailable letter
2 points	"5:00 mailable" letter
1 point	Letter with correctible error(s)
0 points	Unmailable

Weighted Grading Scale

Skill Development	20%
Production Ability	70%
Professional Leadership/Development	10%
	100%

APPENDIX A

INFORMATION PROCESSING

GLOSSARY

Abort--To terminate the execution of a program when an irrecoverable error, mistake or malfunction occurs.

Accuracy--Degree of freedom from errors (mistakes) measured from zero--usually expressed as one error, two errors, etc.; sometimes as errors a minute (eam) or percent of error.

Alpha-numeric--Referring to data that consists of numbers and alphabetic characters.

Archive--The procedure of transferring text from the on-line system disk/diskette to an off-line storage disk.

Author--The person who originally composes a document or letter. Also known as the user or word originator.

Automated Typewriters--Typewriters that print out text from a storage medium.

Automatic Forward Reset--A central telephone dictation recorder feature that automatically locks in the playback mode to the end of the dictation.

Automatic Gain Control--Regulates volume for dictation and transcription.

Automatic Recall--A machine feature to replay the last few words automatically at each start.

Automatic Terminal System (ATS)--A computer system to produce and edit documents.

Background Printing--A system features that queues and prints documents while freeing the keyboard for data entry.

Backlog--The number of dictated documents to be processed.

Backspace--To move printing or enter point (element, daisy wheel, or cursor) to the left one space at a time by striking the backspace or back arrow key once for each character or space.

Backspace Correction--The backspace key can be used to delete characters to the left.

Backup Copy--Information copied from one disk to another in case the original information is unintentionally altered or destroyed.

APPENDIX A (continued)

Bidirectionaly Printing--Special printer capability of printing left to right and then right to left to speed up characters per second printed.

Block--Group of words, documents or files treated as a unit. Block functions allow a user to move, copy, delete, read, or write marked blocks as needed.

Boilerplate Paragraph--A stored paragraph which is played out whenever a document requires it. A variety of boilerplate paragraphs may be combined to create an individual form letter or proposal.

Bold--The option of making a character look darker than other characters. Accomplished by striking the letter more than one time.

Boot--To bootstrap (enter) a routine, especially the operating system of a computer, into main memory.

Buffer--An area of storage used to temporarily hold data being transferred from one device to another. A buffer is used to compensate for the different rates at which hardware devices process data. For example, a buffer would be used to hold data waiting to print in order to free the CPU for other tasks, since it processes data at a much faster rate.

Burster--A forms-handling device to detach continuous forms at marked perforations at a high rate of speed.

Byte--a sequence of bits comprising one character. One byte is composed of eight bits.

Camera Copy--Original documents that are ready for reproduction or printing.

Cancel Key--Stops or cancels a computer command. Also called a RESET or ESCAPE key.

Captured Keystrokes--Text recorded on any type of media--paper, disk, etc., that can be formatted without rekeying text.

Caret--Symbol used to indicate insertions; often used to represent the CONTROL key in word processing manuals.

Cartridge--A container hold a magnetic medium.

Coded Hyphens--Required hyphens that will be printed; soft hyphens would be eliminated if reformatting changes margin requirements.

Clipboard--A process on some programs to allow merging of documents or programs.

APPENDIX A (continued)

Command--An operator instruction used in word processing.

Compatibility--The ability of various units to function together.

Continuous Forms--Forms fed into a printer on a continuous roll with perforations at regular intervals.

Continuous or Endless Loop--An endless tape, permanently sealed in a tank for dictation and transcription.

Control Character--coded character which does not print, but rather initiates some kind of mechanical activity, such as spacing, carriage return, etc.

Control Key (CTRL)--A special key that is pressed at the same time another key is struck, causing that key to perform a special function.

Copy--The option of copying text from within a document or from one document to another.

CP/M--Abbreviation for control program for microprocessors. A widely used operating system for microcomputers, it is composed of the disk operating system and a smaller program portion written in Assembler. It provides the information needed to direct the operation of the microcomputer and its peripheral devices.

cps--Abbreviation for characters per second or cycles per second.

CPU--Abbreviation for CENTRAL PROCESSING UNIT. The internal operating unit or "brains" of an electronic computer system.

CRT--Abbreviation for CATHODE RAY TUBE. A screen like that of a television receiver, used in computer systems for viewing data. A CRT may be used in place of printed copy and, with attached keyboard, forms a terminal.

Cursor--A visual position indicator (dot, line, or square of light) on a display terminal, such as a CRT, that moves along with each character as it is entered from the keyboard. It indicates where a character is to be entered or replaced.

Daisy-Wheel Printer--An impact printer that prints fully formed characters one at a time by rotating a circular print element composed of a series of individual spokes, each containing characters, that radiate out from a center hub. Daisy wheel printers are widely used with word processors.

APPENDIX A (continued)

Data--The numbers, facts, concepts, etc., to be processed by a program, although any information input to a computer system is considered data.

Data Bank--A comprehensive collection of libraries of data. For example, one line of an invoice may form an item. A complete invoice may form a record. A complete set of such records may form a file. The collection of inventory files may form a library, and the libraries used by an organization are known as a data bank. The information is stored in a central computer. A user gains access by dialing a central telephone number. Information is transferred over telephone lines.

Data Base--All of a system's data items, usually of a related nature.

Data Base Management--A systematic approach to storing, updating and retrieving information which is usually in the form of records in files or libraries of data to which many users have access.

Data Communication--The movement of encoded information by means of electrical transmission systems. The transfer of data between points of origin and reception, including all manual and machine operations necessary to transfer such data.

Data Entry--Equipment and procedures designed to capture data in machine-readable form for computer processing, originally by keypunching.

Data Processing--An operational sequence, usually mathematical, performed on facts and figures. The data processor operates upon input data, processes files, and produces output under the control of a stored program. The numeric methods of processing data differentiate it from the syntactical processing of work in wp systems.

Decimal Tab--A feature which automatically keeps decimal points in vertical alignment while columns of numbers are being typed.

Decollator--Forms-handling device for separating the piles of a continuous form into single sheets; normally, carbon interleave, if present, will be removed at the same time.

Default--A value, parameter, attribute, or option that is assigned by the program or system when another has not been specified by the user.

Delete--To take out words, sentences, or lines already in text.

APPENDIX A (continued)

Desk-Top-Unit--A self-contained dictation or transcription unit designed for individual use.

Dial Access--Ability to dial a certain telephone number to control a dictation unit.

Dictionary, Electronic--A program which checks the spelling of words. May also have a checking list of exception words or special words. See Spelling Software.

Directional Arrows--Special cursor movement keys used to manipulate the cursor in four separate directions without removing text from the screen.

Directory--A list of documents currently on a storage medium.

Discrete Media--Recording media, such as cards, disks, and cassettes, that can easily be detached from dictation machines and used on other equipment.

Disk--A high-capacity random access storage device. Data are written onto and read from a stack of revolving record-like disks coated with magnetic material. May be fixed or removable.

Disk (Diskette) Drive--The unit into which a diskette is inserted to be read or written by the CPU (central processing unit).

Diskette--A magnetic, Mylar-coated record-like disk (encased in a square protective envelope) used for recording, reading, and writing by the CPU (central processing unit). Also known as a floppy disk.

Display Screen--see CRT.

Distribution--Document delivery.

Document Assembly--A feature which assembles a document from stored paragraphs.

Document Retrieval--The ability of the system to search, index, and identify specific documents which contain the data being sought.

Documentation--The user's instructions that accompany microcomputer hardware and software.

DOS--Acronym for DISK OPERATING SYSTEM.

Dot-Matrix Character--A printed character formed of dots so close together that it gives the impression of having been printed by uninterrupted strokes.

APPENDIX A (continued)

Draft--Rough copy of a document.

Dvorak Simplified Keyboard (DSK)--An improved typewriter keyboard which provides an average of 35 percent faster production than the standard keyboard by scientific placement of keys. Patented in 1932 by Dr. August Dvorak of the University of Washington.

Edit--To rearrange, change, and correct existing text; editing includes proofreading but is not limited to it.

Electronic Mail--The transfer of documents over communications channels at very high speeds without hard copy.

Electronic Stylus--A pen-like device which is commonly used in conjunction with a CRT for inputting or changing information under program control. The electronic stylus is often called a light pen and works by signaling the computer with an electronic pulse. The computer acts on these signals and can change the configuration plotted across the tube face or perform other operations using the input according to previously programmed instructions.

Electronic Typewriter--A low-level word processor that has an internal memory of approximately a few thousand characters; automates many tedious typing functions.

Element--A ball-shaped printing device on many electric and electronic typewriters.

Elite Type--Twelve spaces of type per horizontal inch (12 pitch).

Endless Loop--A long recording tape with no beginning or end used for the recording of dictated material. Usually enclosed in a "tank."

Enter Key--The key which executes a computer command. Also called the EXECUTE, GO, or RETURN key.

Enter--To input keystrokes; see Key.

Ergonomics--The science of how our bodies relate to our working environment.

Error--Any mistake of a key; also any variation between source copy and displayed or printed copy; departure from acceptable format (arrangement, placement, and spacing).

Error Code--A message which will assist the operator or field engineer in locating the source of a malfunction.

APPENDIX A (continued)

Escape Key (ESC)--A key on some computers which lets the user leave one segment of a program and go to another.

Facsimile--A machine that transmits and receives a picture of a document by using telephone lines.

Field--A term relating to records processing or data base management. A piece of information within a record. Each record within a file may contain a number of fields.

File--A collection of logically related records dealt with as a unit.

Final Copy--Perfected document.

Fixed Disk--A memory disk which cannot be removed from the read/write device, as opposed to a removable hard disk, diskette, or magnetic tape.

Floppy Disk--Recording storage medium.

Flutter--Pitch and volume distortions.

Font--A set of one size and style of type.

Footer--Information formatted to appear automatically at the bottom of every page, such as a page number.

Format--The orderly arrangement of data, such as a list or a table.

Format Line--A line which determines the appearance of the text in regards to vertical spacing, line length and tabs.

Friendly (User Friendly)--A term used to describe computer hardware and software which is easy to understand and use, even by beginners.

Function Key--On a keyboard, a key used to perform a process for the operator.

Generator--A document used in records processing to create a new output format (i.e., envelopes or roster).

Global Search--Computer goes through document to locate a word designated by the operator.

Global Search and Replace--To direct a computer or word processor to locate a repeated series of characters and replace it with a different series of characters automatically through a document (for example, find and replace Co. with Company).

APPENDIX A (continued)

Glossary--A method of reserving and recalling often-used words, phrases, documents, and/or cursor movements.

Graphics--Software designed to create pictures or diagrams including pie, bar, and line charts from data.

GWAM--Gross words a minute. A measure of the rate of keyboarding speed; GWAM = total standard 5-stroke words keyed divided by the time required to key or type those words.

Hands-On--Designating an activity or training that involves the actual operation of a piece of hardware.

Handset--Hand held transmitter and receiver for dictation.

Handshaking--A preliminary exchange of predetermined signals performed by modems and/or terminals and computers to verify that communication has been established and can proceed.

Hard Copy--Computer output that is printed on paper and can be read and handled by people.

Hard Return--Using return or enter key at end of line to wrap or scroll.

Hardware--The physical equipment and components in a computer system.

Header--Information formatted to appear automatically at the top of every page, such as a page number.

Highlight--To intensify the illumination of characters on the CRT. Highlighting graphically emphasizes the text to be acted upon by a specific function. Only the highlighted text is affected by the function.

Horizontal Scroll--An option which permits the set up of wide documents. Expands the horizontal width of the CRT screen.

Host Computer--The primary or controlling computer in a multiple computer operation.

Hot Zone--Hyphenation technique in which the operator specifies a fixed-or variable-length zone next to the right-hand margin. Any word that begins prior to the hot zone and which will not end before encountering the margin is put on the next line automatically.

Hyphenation--The editing procedure used in conjunction with an established hot zone, which searches every instance where hyphenating a word is possible to adjust the right hand margin.

APPENDIX A (continued)

Impact Printer--Printing mechanism that strikes on letters and symbols.

Indent--To set in from the margin, as the first line of a paragraph.

Information Processing--A term used to encompass more than data processing or word processing. Includes all business and scientific operations performed by a computer and all the steps involved in completing a communication on electronic media: input, processing, output, editing and revising, distributing and storing in memory.

Input--Material entered into a system for processing. Also the transfer of data to be processed from keyboard or an external storage device to an internal storage device.

Input/Output (I/O)--Process of transmitting information from an external source to a computer or vice versa.

Insert--To add information to existing text.

Integrated Information System--A system that combines the technologies of word processing, data processing, records management and telecommunications.

Interactive Communications--A system which proceeds to the next step of a process only when the operator or another system provides feedback to a prompt or step.

Interface--An electrical connection which permits a peripheral device or communications channel to be attached to a system. The most common interface employed in word processing is RS-232, which is used for such applications as attaching printers, OCR scanners and communications.

Justified Text--Text printed with even left and right margins.

Key--To strike keys to record or display text and data; also called enter, key in, keyboard, input, or type.

Keyboard--An arrangement of keys on a "board" that is attached to or apart from a machine such as a typewriter, computer, or word processor; also the act of keyboarding typing.

Letter-Quality Printer--Print quality good enough for high-quality business letters. Generally implies print quality equal to that provided by standard office electric typewriters.

APPENDIX A (continued)

Light Emiting Diodes (LED)--An electronic index-display system which eliminates the need for paper index strips or discs on transcribing units.

Line Feed--To advance one line at a time. Usually accompanied by a carrier (carriage) return but sometimes executed as an independent movement.

Line Printer--A printing device that prints one line at a time at a higher speed than a character printer.

List--A group of records which detail certain information to be used with the records processing function. Sometimes referred to as a database or file.

Log--Term used to entering work flow information, e.g., in/out, author, amount, technician, and turnaround time.

Mail Merge--See Merge.

Main Memory--None of the computer's input and output devices can handle data fast enough to keep up with the central microprocessor, which does millions of operations every second. Data which is entered by the microprocessor, as well as output data it sends back, are therefore handled by the computer's high speed main memory.

Math Feature--The option of performing four-function math during a word processing section.

Media--Materials on which recordings are made.

Memory--Storage location in a computer, word processor, or electronic typewriter.

Menu--A list of options from which a keyboard operator may (or must) choose when using a word or data processing machine.

Merge--To combine or consolidate two or more parts of documents. For instance, merging a standard letter with a mailing list.

Microcassette--A small type of recording cassette. Smaller than the minicassette.

Microcomputer--A small-sized computer with a keyboard, screen, and auxiliary storage.

Microfiche--A plastic card containing strips of greatly reduced document photographs.

Microfilm--A fine grained film with extremely small document photographs.

APPENDIX A (continued)

Microprocessor--A very small digital computer, usually produced on a single large chip. The microprocessor is more limited than a minicomputer in most aspects, including memory size and speed, number of instructions and I/O capacity.

Minicassette--A small cassette used for recording dictation. Smaller than the standard size but somewhat larger than a microcassette.

Mnemonic--Assisting, or intended to assist, memory; the art of improving the efficiency of the memory of a computer storage.

Monitor--see CRT.

Mouse--A cursor-type indicator intended to lead the operator to a specific area on a visual display or through specific sequences.

Move--To reposition text from one position or document to another. Sometimes called a "block move."

Network--A system consisting of a computer (or computers) and the connected terminals and related devices, such as modems and input/output channels.

Num Lock--A key that works similar to a Caps Lock key which allows numbers only to be used on a numeric pad when the numeric pad has another function as well.

Numeric Pad--A set of numeric keys on some terminals, adding machines, calculators, or keypunches that are grouped together in a rectangular block so that numeric data can be entered more efficiently; sometimes referred to as a ten-key pad.

Off-line--A wp or dp operation performed on standalone equipment (not connected to another central processor or computer system); often used to designate printer status.

On-line--An operation performed on a local system connected to and sharing the facilities of a remote central processor.

Operating System--Computer programs that control and coordinate the activities associated with the computing functions, computation, input, output, etc. Required software to run software applications.

Optical Character Reader (OCR)--A device used for screening hard copy for conversion to magnetic media.

Originator--The author or user.

APPENDIX A (continued)

Output--The data that results from computer processing.

Overstruck Option--The ability to strike through text with another character.

Pagination--The process of dividing a document through text with another character.

Password--The process of dividing a document into pages as it is created by inserting page breaks.

Peripheral--Any equipment distinct from, but connected to, the central processing unit that may provide the system with outside communication or additional facilities. For example, work stations, printers, or OCRs.

Phrase Storage--A method of reserving and recalling often-used words, phrases, documents, and/or cursor movements.

Pica--Ten spaces of type per horizontal inch (10 pitch).

Pico Cassette--The smallest type of recording cassette. A Dictaphone proprietary item.

Pin-feed--Pertains to any device for controlling the movement of paper in a machine by engaging pins with margin punching. In forms-writing equipment, either a pin-feed platen or tractor.

Pitch--The number of characters per inch of type. Usually 10, 12, 15, 8 or proportional.

Playback--The process of listening to the dictation.

Port--Term commonly applied to an I/O channel, including the physical connector and associated control logic to connect a peripheral device to a mainframe.

Portable Unit--A small self-contained battery-operated dictation unit.

Printer--An output device that converts electronic signals from the computer into human-readable form or HARD COPY. The unit that produces copy on paper--a typewriter or a line printer. A number of different technologies are used, including impact, line, serial, matrix, and nonimpact. Types of impact printers include band, cylinder, daisy wheel, dot matrix/wire, line, selectric, ion-deposition, laser, and thermal machines as well as intelligent copier printers.

Printout--Computer output printed on paper.

APPENDIX A (continued)

Program--A set of coded instructions directing a computer to perform a particular function.

Prompt--A message displayed in the window of an electronic typewriter or on the screen of a computer or word processor telling the user that the machine is awaiting a specific response.

Proofread--To read copy on a display screen or on a printout against the original or source copy and to correct (or mark them for correction); also one of the steps in editing text.

Proportional Spacing--A characteristic which assigns the space on either side of a character in proportion to the character's size. For example, an "i" would have less space assigned to it than an "m". Proportional spacing is in contrast to a standard typewriter or printer arrangement which allots equal space to each character.

Protocol--A formal set of conventions governing the format and control of output between two communicating processes.

Queue--A set of documents waiting in a line to be processed sequentially by a printer or other device. Most systems provide a means for placing documents into and out of queue.

Qwerty Keyboard--A standard typewriter keyboard, as carried over from the printing industry, named for its first six keys. It remains unchanged, since it was produced by Christopher Lathan Sholes in 1873. This keybaord was specially designed to deliberately impede typing.

Random Access Memory (RAM)--Storage or memory which allows data (such as documents) to be stored randomly and retrieved directly by an address location. The system accesses the addressed material without reading through intervening data. Information may be retrieved more speedily from ROM than from serial media, such as tape.

Rate--The speed of doing a task, as keyboarding or typing rate. Usually expressed in words a minute or lines per hour.

Read-Only Memory (ROM)--Information permanently stored in memory which can be read from any location at high speed, but cannot be altered.

Ready Tone--A tone indicating a recorder is available for dictation.

Record--A collection of data compiled of fields. A list is made up of records; each record has fields within the record.

APPENDIX A (continued)

Records Processing--Capability which provides for maintenance, updating, and special use of frequently used lists of information.

Reformat--To change the predefined arrangement and location of data items within a storage unit.

Reprographics--Refers to the production and duplication of documents, written materials, drawings, designs by photocopying, offset printing, microfilming, office duplicating, etc.

Required Space--A space which cannot be split at the end of a line for wordwrap.

Reset--See Cancel Key.

Retrieve--To make stored information available when needed.

Return Key--A key that when struck causes the cursor (or enter point) to move to the left margin and down to the next line. See also Enter Key.

Scan--Listening to a tape at an accelerated rate to locate a specific part of the dictation.

Scroll--To advance (or go back) a specified number of lines in a file that is being displayed on a CRT.

Search--To locate an editing or correcting point within a document by matching a series of character sort words.

Serial--The handling of one element after the other in a single facility, such as transfer or store in a digit-by-digit sequence, or the processing of a sequence of instructions one at a time, i.e., sequentially.

Shadow Printing--A double strike-over technique that allows a character printer to create a boldface effect.

Shared Logic--A system with several input and output devices linked to one host computer that then controls recording of input/output. A shared-logic system is in contrast to a standalone system, which accomplishes all text processing in one unit.

Shared Resource--A system in which two or more computers have peripherals, such as printers.

Sheet Feeder--A device when attached to the printer that will automatically feed paper and envelopes into the printer without operator assistance.

APPENDIX A (continued)

Shift Key--A key used to make capital letters and certain symbols when struck at the same time as another key.

Slave--I/O or printer-driven modules driven by a master unit. In some low-level wp applications, it is common to have a "master" unit plus a number of "slaves" automatically grinding out repetitive letters.

Soft Copy--Text which is displayed on the CRT, in contrast to hard copy which is the printer output.

Software--Programs, languages, and/or routines that control the operations of a computer in solving a given problem.

Sort--An option available on a word processor which quickly arranges records of text in either ascending or descending order.

Source Documents--Forms on which raw text or data are written and from which a machine operator keys and formats.

Spelling Software--Software which allows an operator to check the spelling of text within the document. Will identify words which are not currently found in the spelling software.

Spreadsheets--Software designed for accounting purposes to perform math operations.

Standalone--A self-contained text or data processing system able to accomplish all phases of processing, including entry, recording, editing, and final playout. A standalone system is in contrast to a shared-logic system.

Status Line--Indicates information about a document including such things as document name, cursor, line, and page position.

Stop Code--A reference code recorded on magnetic media which causes the system to stop during printout. Used to allow the operator to perform such manual procedures as changing fonts or paper on the printer.

APPENDIX A (continued)

Storage Capacity--Total amount of data stored per unit of media (card, cassette, diskette, disk) which may be accessed by the system without changing media. A magnetic card system has about 5,000 to 10,000 characters on-line. A magnetic tape cassette would hold up to 300,000 characters. A diskette holds about 250,000 to 300,000 characters, but in many cases the word processor's operating system software is also stored on the diskette, so only 60 to 100 pages or so of storage are available. A disk can hold much larger quantities of data, frequently 2 to 50 million characters or more on each disk.

Storage Device--Any of various devices capable of retaining data for relatively long periods of time, such as a punch card, disk or tape.

Store--To save information on magnetic media so that it may be used later.

String--Any continuous group of characters, including text and/or control codes.

Subscript-Superscript--A character typed below or above the baseline of the text (e.g., H_2O).

Switch Code--A code which permits switching between media stations or a wp system, allowing the system to combine such separately stored text as an address list with a repetitive letter. See merge applications.

Tab--Horizontal spacing capability; paragraph indentions; tab grids (preset series of indentions, usually every five spaces; and decimal or alignment tabs which align data at decimal points).

Technique--The degree of expertness with which a task is performed; also good form, style.

Telecommunications--The transmission and reception of data over telephone lines. The medium by which a system in one location can send text to or receive text from a system many miles away.

Template--Used in some word processing functions to define format and design of the information.

Terminal--In general, a device operating remotely from a central computer or wp system, connected via telecommunications. Any device that can send and/or receive data by a communications channel.

APPENDIX A (continued)

Text (Data) Entry--The process of getting text and data from the writer's mind or from a written or voice-recorded document into the computer or word processing system.

Text Editing--Proofreading and revising material using a word processor.

Text Editor--A wp typewriter; one that records or captures keystrokes on a medium and that has the ability to make additions, deletions, corrections, and format changes in the recorded text prior to automatic playout of unfinished documents. Text editing typewriters may be either interactive or standalone.

Touch Keyboarding (Touch Typewriting)--Input on an electric or electronic keyboard without constant looking at the keyboard such as when reading from printed copy or composing at the keyboard.

Transcription--The process of typing dictated material.

Turnaround Time--The time required for a document to be typed, proofread, corrected, and returned to the user (word originator).

Update--To put into a master file changes required by current information or transactions.

Upgradable System--A wp system that is programmable; a system that can be upgraded to accept additional software programs used to control a computer operation.

User--The word originator or author.

User-friendly System--A system that is easy to learn and use.

User-manual--A book of instructions issued to work originators outlining procedures for proper dictation and setting forth other document, style, and wp standards used in the organization.

Utility Specialist--Title used for the person totally trained in all functions performed in a wp center and designated as a sypervisory backup.

Variables--The parts of a form letter which change with each letter, for example, name, address and salutation.

Verification--In data entry, the practice of keyboarding the data twice, the data entry system performing a character-by-character comparison.

APPENDIX A (continued)

Widow--When the last line of a paragraph appears on the first line of a page or column of text. Undesirable because it is graphically awkward.

Windowing--A capability of dividing the CRT screen into different segments by opening more than one file.

Word Processing--The writing and storing of letters, reports, and other documents on a computer, electronic typewriter, or word processor; may also include printing of the final document.

Word Processing Center--A typing support organization within a company to meet all the typing needs of that company. The word processing center is usually comprised of: 1) automated typing equipment with unlimited editing and storage capabilities, able to produce documents in a wide range of formats and styles; 2) trained typing specialists; 3) automated dictation equipment; and 4) specified procedures.

Word Processing Operator--The next level up from Word Processing Trainee for those having 6-24 months of word processing experience. In addition to having all the qualifications and functions of the trainee position, a word processing operator handles special documents, meets established quality standards, uses all of a machine's text editing functions and is familiar with department terminology and company practices.

Word Processing Specialist I--A Word Processing Operator with a minimum of 18 months of experience who can format, produce and revise complicated documents, such as lengthy technical and statistical reports, from complex source information, including the retrieval of text and data from electronic files. Exercises independent action when interpreting instructions to produce a quality document, understands proofreader marks, and assumes full responsibility for document accuracy and completeness. Has a thorough knowledge of center procedures and maintenance of records. May operate word processing equipment in the telcommunications mode.

Word Processing Specialist II/Assistant Supervisor--A person at this level exercises all of the competencies of a Specialist I and may act as Assistant Supervisor. This person is able to operate all the information processing equipment within the installation. Responsibilities include coordinating and assigning work, analyzing requirements for specific projects, communicating with users, compiling production statistics, and recommending changes in center procedures. May also assist in training personnel.

APPENDIX A (continued)

Word Processing Trainee--Entry level position for those having 0-12 months of word processing experience. Must have adequate typing skills, good knowledge of grammar, punctuation, spelling and formatting, the ability to use dictionaries, handbooks and other reference materials, and be oriented toward teamwork and the use of machines. A trainee's functions include routine transcription and manipulation of text from various types of source information (dictation, handwritten, etc.). Maintains own production records and may be required to proofread own work.

Work Station--A component of the system consisting of a CRT and keyboard at which an operator keys in and edits a document. The work station works in conjunction with the master processor, printer, and other peripherals.

Wraparound--A process whereby a system adjusts margins automatically without the operator pressing a return key at the end of every line.

Writing Line--The maximum line length that can be written by a machine, expressed in terms of characters or inches; in line printers, a writing line is identical to print positions.

APPENDIX B

PROFESSIONAL/LEADERSHIP DEVELOPMENT - EXAMPLE 1

Business Education Department Name: _____

Course: _____ Year: _____ Semester: 1 2

- -

Professional/leadership development skills are necessary to assist students transferring from a school environment into the workforce. When students accept positions with business, they also accept a responsibility for adapting to the social structure and working with other individuals in that business. According to many businesses, people lose or leave their employment, not because they are not technically qualified, but because they cannot get along with their co-workers or supervisors. Employers rightfully expect that a well-trained Business Education Program graduate will possess interpersonal relationship skills, qualifying them to interact with others in a positive and productive manner.

For these, as well as other reasons, professional/leadership development has been made a requirement of all vocational education programs in Washington State including Business Education.*

Therefore, all students in each Business Education course will be evaluated on professional/leadership development based on the number of activities in which they participate:**

4 activities per class = A
3 activities per class = B
2 activities per class = C
1 activity per class = D

*WAC Chapter 490-48A-010 Vocational Student Organization: Leadership development in vocational programs in secondary schools, vocational-technical institutes, and community colleges will be made available to all students as an integral part of the instructional program.

**In order to evaluate students in each class, there should be a student learning objective (SLO) documented for each class and weighted 10-20 percent of the course grade. This would serve as an accountability device for the instructor and as a goal/objective for the student to accomplish.

State of Washington, Superintendent of Public Instruction, Standards for Vocational Education Programs 81-4B, Item Number 5: Leadership development through planned activities providing for transition from school to job must be an integral part of the instructional program . . . .

APPENDIX B (continued)

Professional/leadership development activity report forms must be requested from the Business Education instructor, completed by the student and signed by the adult in charge of the activity. Completed activity forms are to be stapled to a cover sheet and submitted to the Business Education instructor. To receive credit for a particular activity, it may not be repeated (e.g., each activity can receive credit only one time per class per semester).

SUGGESTED PROFESSIONAL/LEADERSHIP ACTIVITIES

1. Officer of a school organization (FBLA, etc.)
2. Member of a school organization (FBLA, etc. - dues paid)
*3. Attendance at a school organization conference: (FBLA District Fall Leadership Conference; Spring Leadership Conference; State Leadership Conference)
4. Participate in a school organization fund raiser
5. Attend a school organization meeting
**6. Ninety percent of Excellence Points
7. Prepare a bulletin board for classroom
8. Arrange for a guest speaker
9. Introduce a guest speaker
10. Volunteer to work on a student body or school organization committee
11. Volunteer for community service/charity activity
12. Attend a meeting of a professional organization (e.g., Kiwanis, Advisory Committee, Chamber of Commerce, Rotary Club, etc.)
13. Interview a person in a business position not employed in an educational position
14. Review in written/oral presentation the history of (officers, duties, constitution, etc.) a professional organization/vocational organization
15. Report in written/oral form experiences gained through attendance at a civic organization (e.g., Kiwanis, Rotary, etc.)
16. Design an independent project with instructor's approval
17. Dress in business attire

*FBLA State and National dues must be paid to attend Regional, State and National conferences. Dues for 1987-88: Due December 1; $3.00, State--$4.00, National in order to compete at State Leadership Conference. Dues are payable on or before February 1 in order to attend State Leadership Conference.

**Excellence Points refer to five points daily that each student receives for being in class, on time, prepared to go to work and using appropriate interpersonal relationship skills throughout the class period.

APPENDIX B (continued)

PROFESSIONAL/LEADERSHIP ACTIVITY REPORT FORM

Name: _____ Date of Activity: _____

Description of Activity: _____

_____

Keep this form until all activities are completed for the semester. Staple all forms to a cover sheet and submit to the Business Education class instructor.

_____
Signature of Adult Supervisor

- -

GUIDELINES FOR PROFESSIONAL/LEADERSHIP DEVELOPMENT COMPONENTS
EXAMPLE 2

Professional leadership development components, defined by student learning objectives, should be included in EACH COURSE in the Business Education Program.

The Business Education instructor(s) should keep the following in mind when teaching to these objectives: 1. Students must be aware of the objectives being taught; 2. The instructor needs to be creative in developing and using professional/leadership activities in order to avoid duplication of activities used in other Business Education courses; and 3. Records of activities must be kept for each student in EACH COURSE.

These guidelines are offered to provide assistance for instructors. Included are general operating procedures, suggestions for implementation, strategies for delivering professional/leadership development and suggested, successful activities implemented by other instructors.

General Procedures:

1. Select three of the traits/work habits listed in the objectives for emphasis in each course.
2. Determine no more than four indicators for each trait/work habit.
3. Tell the students the professional/leadership development emphasis for EACH COURSE, the indicators that will be observed and the manner of grading and recording.
4. Provide student with appropriate instruction.
5. Follow up with observation, grading and recording.

APPENDIX B (continued)

Implementation:

1. In a lab delivery system, take the course outlines/syllabi for each of the courses being delivered and make a composite list of the topics to be covered. Cross-reference the list with the district's recordkeeping form for professional/leadership development.
2. Identify activities for teaching each topic. Resources might include: textbooks, periodicals, conference and inservice sessions, district professional/leadership development activities and co-educators.
3. Designate specific days of the month/week as days when everyone in class will interact on activities (e.g., small group tasks, film, group project).
4. Promote peer counseling activities--students training other students.
5. Appoint class managers, rotating on a regular (weekly) basis. Tasks assigned to managers might include: recordkeeping duties, proofreading, etc.
6. Provide simulations, practice sets or case studies to assist in delivering instruction in professional/leadership development.
7. Develop simulations using structured groups of students.
8. Request students to account for their own professional/leadership records.

Strategies for Teaching Professional/Leadership Development:

1. Obtain examples and resources from the business community--Advisory Committee members.
2. Draw from personal work experience--the teacher's or the students'.
3. Integrate seminars/workshops and class discussions into the course.
4. Develop an audio-visual presentation and follow this up with a class discussion or a written reaction paper.
5. Arrange for individual field trips for students and require a follow-up written or oral evaluation.

Leadership Traits/Habits for Emphasis in EACH COURSE:

1. Dependability (e.g., attendance, punctuality, meeting deadlines, having appropriate materials for class--pencil, paper, etc.).
2. Self-discipline (e.g., correct technique, working with distractions, paying attention, respecting equipment).
3. Following oral instructions adequately.
4. Following written instructions adequately.
5. Practicing problem-solving techniques.

APPENDIX B (continued)

PROFESSIONAL/LEADERSHIP DEVELOPMENT - EXAMPLE 3

Name: _____

Class: _____ Semester: _____

Points Earned: _____ Grade: _____

- -

DIRECTIONS: Professional/leadership points for EACH Business Education class will be recorded. Make sure to obtain the necessary signature(s) for verification. Signature(s) may be recorded at the end of this form. Attach any required papers to this form. If any help or suggestions are needed for obtaining points, talk with the instructor(s). These points will count toward 10% of the final grade for this class. USE ONE FORM PER BUSINESS EDUCATION CLASS.

Points:		Earned:
50	Pay dues to a student organization	____
70	Attend a State Conference	____
50	Attend a Regional Conference	____
75	Hold office in a student organization	____
**	Serve as a Committee Chair	____
**	Serve on a Committee	____
**	Sell fund-raising items	____
25	Attend a student organization meeting	____
25	Donate two cans of food for a food drive	____
25	Type a project for a teacher or student	____
25	Introduce a guest speaker	____
10	Help another student with an assignment/project	____
10	Donate food to a Business Department student function	____
50	Visit a business and evaluate the experience	____
50	Present an oral report to the class	____
10	Exhibit appropriate grooming/hygiene-- "Dress Up Day"	____
25	Write a thank-you letter to a speaker, etc.	____
25	Practice good housekeeping practices in class	____
100	Perfect attendance this term	____
25	Always on time for class	____
50	Design and put up a classroom bulletin board	____
75	Write a paper on interpersonal relationships	____
50	Attend a leadership camp	____
50	Visit a post-secondary school and submit a written evaluation	____
10	Demonstrate some technique/project to the class	____
10	Assist with planning a field trip	____
25	Prepare an employment application	____

APPENDIX B (continued)

25	Prepare a Resume	_____
25	Prepare a Letter of Application	_____
25	Prepare a Letter of Inquiry	_____
10	Make signs/posters to promote the Business Department	_____
10	Answer the telephone in a school office in a businesslike manner	_____
25	Receive Student of the Week Award	_____

**Number of points depend on the type of committee or fund-raising project. The instructor will determine the points to be awarded.

SIGNATURE(S) REQUIRED FOR VERIFICATION:

_____

_____

_____

_____

_____

APPENDIX C

DICTATION LEARNING ACTIVITIES

Activity 1

Familiarize yourself with the dictation equipment.

Dictate the paragraph into the dictation unit. Dictate unusual punctuation and spellings.

Transcribe your own dictation in mailable format using only the tape.

Activity 2

Dictate the script into the dictation unit. Dictate unusual punctuation, paragraphs, and unusual spellings. Portions of the script are instructions to the transcriptionist and portions are the actual transcript.

Transcribe your own dictation in mailable format using only the tape.

Activity 3

Dictate the letter into the dictation unit. Say what it is--letter, memo, report, etc. Spell out the proper names and technical terms. Indicate paragraphs.

Transcribe the dictation using only the tape.

Activity 4

Review the "Tips for Dictation." Dictate Activity 4 into the dictation unit. Your output should be identical to the original. These may be complicated instructions so be sure that you are thorough in your instructions. Indicate items that should be underscored, centered and/or indented, in all caps or bold faced type.

Transcribe the dictation using only the tape.

Activity 5

Dictate the letter using the notes as the basis of your information. Provide complete sentences and all instructions for the transcriptionist.

Transcribe the dictation using only the tape.

APPENDIX C (continued)

Activity 6

Dictate instructions on how to get to your home from your current location. Try dictating without making prior notes.

Transcribe the dictation.

Activity 7

Dictate a memo to your instructor with ideas on how you plan to schedule your time for the next week.

Transcribe your dictation.

Activity 8

Prepare notes indicating the advantages and disadvantages of using dictation equipment. Compare to other methods of document generation (i.e., longhand, typed rough draft, and/or shorthand).

Dictate a report using your notes as guidelines. Transcribe the dictation using only the tape. Submit your notes with the transcribed copy.

Activity 9

Transcribe one or more of these activities from another student's tape. Complete the critique sheet on his or her dictation style.

APPENDIX C (continued)

Activity 1

Word processing is simply computer-assisted keyboarding which allows us to easily modify and change text. Documents may be stored magnetically and retrieved for later use. Wordwrap allows us to continue keying until we reach the end of a paragraph. We do not need to return at the end of each line. One of the nicest features about word processing equipment is its ability to be forgiving when we make mistakes. Usually a simple backspace will allow us to correct a typing error. We also have the flexibility to insert, delete, or replace text as needed.

APPENDIX C (continued)

Activity 2

"This is Roberta Brown. This is Wednesday, the 19th of December at 10:00 a.m.

This is a letter.

I need just one copy.

Standard storage.

This letter will be sent to . . .

Merrill (that's M-e-r-r-i-l-l) P. Forrester (F-o-r-r-e-s-t-e-r comma), capital P small h period capital D period
Provost (P-r-o-v-o-s-t)
Hedley (capital H-e-d-l-e-y) Academy
Montville (M-o-n-t-v-i-l-l-e comma), Pennsylvania 17750

Dear Merrill:

I would be delighted to participate in your (capital C) Commencement (capital d) Day exercises (period). The title of my address is the same as my book (underscore please, capital T) The (capital N) New (capital A) American (colon capital B) Benign (capital P) Passivity or (capital A) Aggressive (capital I) Involvement (period paragraph).

I plan to fly into Harrisburg on the evening of June 6 (comma), and will rent a car for the drive to Montville (period). Upon arrival (comma), I'll go directly to the (capital L) Leslie (capital W period) W. Guld (capital G-u-l-d capital M) Memorial (capital G) Guest (capital H) House (period). On June 7 (comma), I'll leave around 7:00 p.m. to catch the 8:20 return flight to New York (period paragraph).

My memories of Hedley are fond ones indeed (comma), and I look forward to being with you and renewing many warm friendships (period).

Sincerely,

(and I'll sign that as Roberta Brown, Vice President)"

APPENDIX C (continued)

Activity 3

Jonothan Hughes
Vocational Director
Lithonia School District
2201 Canyon Road
Lithonia, GA 30058

Dear Mr. Hughes:

Thanks for the time you and Donna were able to spend with me on Friday, April 23. I know your schedule was busy and I appreciate your fitting me in on such short notice.

The information you shared with me--including the materials--was very helpful. I have shown most of it to Mike and we both agree that the advisory committee packet will be plagiarized. He was also impressed with your latest vocational program catalog.

I also enjoyed my time with Walt. He's certainly well qualified to tackle the merging of the print shop and graphics program. I suspect your "model" may turn up in other places around the state.

If I can ever pay you back for your help, please let me know.

Sincerely,

Mary L. Smythe
Administrative Assistant

APPENDIX C (continued)

Activity 4

SPELLING NAMES AND ADDRESSES

Mary L. Anderson, President
WORDEX Office Supplies
7104 Edgewater Avenue
Oakland, CA 94621

Robert Yuhl
C-Wood Construction Company
P.O. Box 1485
Vancouver, WA 98666

INSTRUCTIONS FOR CAPITALIZATION

Can you cite construction costs of Phase One, Happy Valley PUD?

The report I am referring to appeared in the February issue of Today's Office. The article is entitled "The High Cost of Employee Absence," and the Word Processing Department has a copy of the magazine.

PUNCTUATION INSTRUCTIONS

Many words in our language sound alike but have different spellings. It's a good idea--whenever you dictate--to spell out these homonyms. Remember, context may make the meaning and proper spelling clear to you. However, if it's not clear, check with the author.

Below are several words that are often confused:

sight	cite	site
personal	personnel	
accept	except	

ADDITIONAL INSTRUCTIONS

Dictating will probably be a happier experience for both the dictator and the transcriptionist if these steps are followed before you being.

Establish Your Purpose

What do you want to say in this dictation?
What results do you want?

Organize Your Materials

Correspondence--including names, addresses, zip codes
Reports
Make an outline

ACTIVITY 5

CONTINENTAL PROPERTIES

500 WEST 8TH STREET, SUITE 235
VANCOUVER, WASHINGTON 98660
PHONE (206) 695-1566

March 13, 1987

Secretary -
Please respond to this letter based on my notes in the margin. Thx
Marion

Marian Hanigan
Business Supply Company
215 W. 15th Street, Suite 103
Vancouver, WA 98660

Dear Marian:

RE: Lease dated April 25, 1985

Our office records indicate the above Lease Agreement will expire May 31, 1987.

In order for us to prepare an office inventory schedule, please advise us of your intent regarding the continuation of said lease at an early convenience. We have some present leases expiring to provide you additional space at the Merchants Building if necessary. — which spaces are available?

A response at your earliest convenience will be most appreciated. I trust we can amicably negotiate an extended lease and term.

What's the cost of each?
When can we see these spaces?

Sincerely,

John Allums

John Allums
Property Manager

dek

Need decision by 4/30 for our annual meeting

What options for monthly cost based on 1-, 3-, or 5-year lease options?

price difference if we have our own contracted janitorial services?

Will they negotiate costs for rewiring for our new computers?

APPENDIX C (continued)

DICTATION CRITIQUE

Transcriptionist _____

Author _____

Date _____

Listed below are factors affecting the efficiency of dictation/transcription productivity. Indicate with a minus (-) those items that need additional attention in the future. Use a plus (+) to indicate items that were well done.

Instructions

_____ greeting the transcriptionist
_____ identifying author/dictator
_____ type of message/document
_____ number of copies
_____ filing/retention instructions
_____ special instructions
_____ parts of message
_____ paragraph notations
_____ unusual punctuation, capitalization, spelling
_____ closing instructions (end of document)

Content

_____ dates consistent
_____ logical sequence/coherent
_____ numbered items emphasized
_____ grammar usage
_____ correct/consistent information
_____ consistency in tenses, plurals, etc.
_____ other

Delivery

_____ conversation style
_____ articulation
_____ inflection to distinguish text from instruction
_____ tempo
_____ voice quality
_____ pitch
_____ volume
_____ minimal background noises
_____ other

APPENDIX D

OFFICE PRODUCTIVITY STANDARDS

Ruprecht and Associates

WORD

5 characters per word

LINE

10 words per line
50 characters per line

PAGE

8 1/2 x 11 - 30 ds lines

8 1/2 x 11 - 50-66 ss lines

8 1/2 x 14 - 45-55 ds lines

8 1/2 x 14 - 75-80 ss lines

DICTATION

Work created by longhand	10-12 wam
Work created by shorthand	23-30 wam
Work created by machine:	
Inexperienced dictator	60 wam
Trained dictator	80 wam
Trained & experienced	80-120 wam

AVERAGE WORKDAY

7.5 hours - average work hours
1.5 hours - (less) fatigue time
6.0 hours - productive day
1.0 hours - (less) personal time
5.0 hours - productive time per day

PRODUCTION LINES PER DAY BY MACHINE CATEGORY

Type of Machine	Outstanding	Superior	Acceptable	Unsatis-factory
Standard Electric	500 & over	250-500	200-250	Less than 200
Electronic Type-writer w/ Memory	1450 & over	1000-1450	500-1000	Less than 500
Standalone Unit (e.g. Micro-computer w/ Software)	1700 & over	1500-1700	900-1500	Less than 900
Multi-Terminal System w/ Information Sharing	4000 & over	2500-4000	1000-1700	Less than 1000

V312QB.01

APPENDIX E

OFFICE AUTOMATION AND TELECOMMUNICATION:

APPLYING THE TECHNOLOGY

Prepared By:
Dr. William Mitchell
University of Wisconsin-Eau Claire
Eau Claire, WI 54701

APPENDIX E
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OFFICE AUTOMATION DEFINITIONS AND OBJECTIVES

Office Automation (OA) is:

1. The electronic integration and communication of the information processes (voice, data, word, image, video).

2. A program designed to improve the efficiency and effectiveness of business communication through the integration of people, procedures, electronic office equipment and telecommunications technology into an organized and managed system.

3. People using technology to manage and communicate information more effectively.

4. The careful integration of technology with improved office processes to increase the productivity and effectiveness of all office workers--management, professionals, secretaries and clerks.

   NOTE: OA must never be considered solely as acquiring new technology. Equipment can only help improve the efficiency of the operation--it is much more important to be effective in doing the right things than to be efficient doing the wrong things.

Objectives:

1. To increase the productivity of managers and professionals.

2. To provide more responsive administrative support at all levels.

3. To upgrade the quality and quantity of document/information output.

4. To increase the speed of communicating information between sender and receiver(s).

5. To reduce costs of office operations.

6. To improve internal, external and written communications.

7. To electronically integrate the information processes.

FUNCTIONAL CATEGORIES OF OFFICE AUTOMATION SOFTWARE PACKAGES FOR MINI AND MAINFRAME COMPUTERS

1. Communications
   a. Electronic mail
   b. Voice mail
   c. Access to public data bases

2. Information Retrieval
   a. Document based management (filing) system
   b. Organizational data base

3. Analytical Tools
   a. Spread sheet applications
   b. Calculator functions
   c. Graphics (selected packages)

4. Text Processing
   a. Word processing
   b. Mail/merge functions
   c. Sort functions
   d. Spelling verification
   e. Forms/report generation (selected packages)
   f. Automatic hyphenation (selected packages)

5. Personal Support Tools
   a. Schedulers
   b. Calendars
   c. To do/did lists
   d. Ticklers

6. Special Applications and Programmability
   a. Accounting/data processing functions
   b. Decision support functions
   c. System security and user access
   d. User ability to develop programs for specific functions

NOTE: Sampling of OA software packages for mini/mainframe computers:

AT&T: Dimensions 75/85
DG : CEO
DEC : All-in-one
HP : Desk Manager
IBM : Profs
WANG: Office

OFFICE AUTOMATION RELATED SOFTWARE FOR MICROCOMPUTERS

1. Integrated Software
   a. Incorporates ability for multi-functional activities within the package
   b. Sampling of integrated software

PACKAGE	WP	SS	GR	DB	TE	Other	Cost*
Ability	X	X	X	X	X		$495
Corporate MBA	X	X	X	X	X	EM WI	$695
Enable	X	X	X	X	X	WI	$695
Framework	X	X	X	X	X	FP OG WI	$695
Open Access II	X	X	X	X	X	TM WI	$595
Smart System	X	X	X	X	X	TM WI	$895
Symphony	X	X	X	X	X	WI	$695

EM = Terminal Emulation
WI = Windows
FP = Forms Processor
OG = Outline Generator
TM = Time Management

*The costs shown are list prices for packages used in a standalone environment. Networked versions will be higher, e.g., the networkable package "Smart System" lists for $1,995 in a three-terminal environment.

2. Integrator Software (Integration Interfaces)
   a. User accesses output from other software packages
   b. Requires hard disk storage
   c. Sampling of integrator software
      1. DesQ (Quarterdeck)
      2. GEM (Digital Research)
      3. Topview (IBM)
      4. Windows (Microsoft)

3. Sampling of Software Vendors and Their Product Line
   a. Ashton-Tate
      1. dBase II and dBase III
      2. Framework
      3. Multimate (Ashton-Tate purchased Multimate International in 1985)
   b. Digital Research
      1. Concurrent DOS operating system
      2. CP/M operating system
      3. GEM
   c. Lotus Development Corporation
      1. Jazz
      2. Lotus 1-2-3
      3. Symphony
   d. Micropro International
      1. Calcstar
      2. Easy
      3. Spellstar
      4. Starburst (forms generator)
      5. Wordstar and Wordstar 2000
   e. Microsoft Corporation
      1. Basic
      2. MS DOS, Xenix operating systems
      3. Multiplan
      4. Project (planning software)
      5. Windows
      6. Word
   f. Software Publishing
      1. pfs:File
      2. pfs:Report
      3. pfs:Write

OFFICE AUTOMATION ARCHITECTURE
TOP-DOWN DESIGN

1. OA Software Installed on Computer (Mini/Mainframe)
   a. Computer initially acquired for DP functions
   b. Information processing functions integrated via OA software
      1. Data processing
      2. Word processing
      3. Document distribution
      4. Electronic mail/messaging
      5. Electronic filing
      6. Data base access
      7. Calendaring/scheduling

2. Advantages of the Top-Down Design
   a. Computer system already in place
   b. Possible to implement OA with minimal investment in hardware

3. Shortcomings of the Top-Down Design
   a. Additional time required to implement OA, e.g., system security
   b. Comprehensive OA software not available on all mainframes
   c. Degradation of system response time as more terminals and functions are implemented
   d. Training for OA applications complicated by system security, locating the appropriate application software module and dedication to DP functions.

OFFICE AUTOMATION ARCHITECTURE
BOTTOM-UP DESIGN

1. Work Station Level
   a. Select most critical problem(s) to be solved
   b. Identify software available to address problems
   c. Examples of problem areas addressed by the "off-the-shelf" software
      1. Word processing
      2. Personal computing
      3. Personal filing
      4. Personal management
   d. Standardize on operating system and minimum hardware components
   e. Install and implement the workstation

2. Information Systems Integration Level
   a. Proceed with the steps to link the system
   b. Areas to be addressed at the system level
      1. Electronic mail
      2. Electronic filing
      3. Document and information sharing
      4. Device sharing
      5. Communication gateways
      6. Enhancement of internal support
   c. Networking addressed at this level
      1. Office automation software for mini/mainframe based systems or networked integrated/integrator software for microcomputer based networks
      2. Hardware alternatives to drive the system
         a. Existing work station with additional RAM memory and hard disk/card
         b. Minicomputer
         c. Controller with file server
      3. Communication software
      4. Communication link alternatives
         a. PBX/Modems
         b. LAN
         c. Combination PBX and LAN
   d. Select software, hardware and communication link
   e. Install and implement the system

3. Total Systems Integration Level
   a. Proceed with the steps to expand the network
   b. Areas to be addressed at the information systems level
      1. Access to distributed computer systems
         a. Other departmental data bases
         b. Organizational data bases
         c. Public data bases
      2. Office automation software on the mainframe
      3. Expansion of the features identified in Level 2
   c. Mainframe is connected to the network

4. Advantages of the Bottom-Up Design
   a. User oriented from the beginning
   b. Much easier to sell to the staff
   c. Faster implementation
   d. Lower entry-level costs for hardware
   e. Training costs minimized
   f. Problem areas addressed immediately

5. Shortcomings of the Bottom-Up Design
   a. Many organizations are beyond the work station level and have a variety of microcomputers that are not compatible
   b. Requires additional software costs prior to networking
   c. All applications software is not networkable
   d. LAN software has not reached the same level of maturity as mini/mainframe software

OFFICE AUTOMATION ARCHITECTURE
DEPARTMENTAL DESIGN

1. Equipment Setting
   a. Mainframe used for DP functions
   b. Proliferation of microcomputers for "specific" functions
   c. Micro to mainframe link may not be realistic

2. Acquire Microcomputer System(s) with OA Software on a Departmental or Other Unit Basis for:
   a. Communications
      1. Electronic Mail/Voice Mail
      2. Public data base access
      3. Document distribution
   b. Information retrieval
      1. Document based management (filing) systems
      2. Departmental data base
   c. Analytical tools
      1. Spread sheet applications
      2. Calculation
   d. Word Processing
      1. Editing
      2. Mail/merge functions
      3. Sorting
      4. Spelling verification

e. Personal support tools
    1. Calendars
    2. Schedulers
    3. Ticklers
f. Special functions
    1. Security
    2. Programming tools

3. Link OA System to Mainframe Via Software for:
    a. Access to organizational data base
    b. Increase system scope
        1. Document distribution
        2. Electronic mail
        3. Data base access

4. Bring Microcomputers into the OA System as Terminals on the "Departmental" Minicomputer

5. Advantages of the Departmental Design
    a. May be the only realistic alternative
    b. Immediate access to OA applications
    c. Proven hardware and software already on the market
    d. Software designed for the occasional user
    e. Mainframe link and microcomputer phase is approached on an "as needed" basis

6. Shortcomings of the Departmental Design
    a. Equipment duplication
    b. Substantial initial investment

TELECOMMUNICATIONS--WIDE AREA NETWORKS

1. Definitions
    a. Telecommunications is any transmission or reception of signals, writing, sounds, by wire, radio, visual, or electromagnetic systems
    b. Wide area networks are designed to interface voice, video, fax, data communications and teleconferencing capabilities

2. Advantages of Wide Area Network Systems (sometimes called Value Added Networks)
    a. Facilitate the flow of information
    b. Allow different people to interact
    c. Provide value added services
        1. Electronic mail/message/voice systems
        2. Store and forward alternatives
        3. Alternative types of telecommunication (message switching, packet switching)
        4. Data integrity

3. Transmission Background Information
   a. Switched (dial-up) analog service over telephone lines is generally limited to 9,600 bps
   b. Leased (dedicated) line analog service is essentially limited to 19,200 bps
   c. Switched (dial-up) and leased digital line service where available is 56,000 bps
   d. To maximize leased line service, multiplexers and/or concentrators are used so that two or more devices share the same line
   e. T1 digital service, now available to end users, transmits at 1.544 Mbps
   f. Packet switching, where a message is divided into smaller "blocks" and the "blocks" are then transmitted over alternate routes and assembled in the right order at their destination, is generally faster and more economical than sending a message in total over a switched line

4. Partial List of Wide Area Networks
   a. CYLIX--RCA Communication Network
   b. ITT World Communications, Inc.
   c. SBS (Satellite Business System)--IBM, COMSAT General Corporation and Aetna Life and Casualty
   d. SKYNET--AT&T
   e. SPRINT--GTE Communications Corporation
   f. TELENET--GTE Communications Corporation
   g. TYMNET--Tymshare, Inc.

5. Background Characteristics of Wide Area Networks
   a. CYLIX--RCA Communication Network
      1. Primary market--small to medium users
      2. Satellite based with a primary and backup satellite
      3. Hierarchial star network
      4. Packet switching network, non-voice lines
      5. Thirty earth stations linked to Memphis control center
      6. 1000,000 miles of land lines leased from AT&T
      7. Transmission speed is 9,600 bps
      8. Electronic mail capability
      9. Installation charge--$900, $1,000 month host computer connection fee, $345 remote location connection fee per month
      10. Address: 800 Ridge Lake Boulevard
          Memphis, TN 38119--9404
          (901) 761-1177

b. ITT World Communications (International Telephone/ Telegraph)
   1. Primary market--large organizations with nationwide and worldwide communication needs
   2. Emphasis on voice, data, record services
   3. Timetran (store and forward message service), ARX (Automatic Retransmission Exchange), Dedicated Circuits, Databridge Infotex (packet switching service), and FAXPAK (computerized facsimile service) represent a sampling of ITT's value added features
   4. Services that ITT is adding include electronic mail, video teleconferencing and enhanced facsimile services
   5. Dial-up access speeds from 50 bps to 4800 bps with dedicated circuits up to 56K bps are accommodated
   6. All codes from Baudot to ASCII and EBCDIC plus latest protocols to include 3780 and 3270 (bysynchronous and X.25 packet switching are acceptable)
   7. Installation charges depend on service desired
   8. Address: ITT World Communications, Inc.
      67 Broad Street
      New York, NY 10004
      (800) 424-1170

c. SBS (Sattelite Business System)--IBM, COMSAT General Corporation and Aetna Life and Casualty
   1. Primary market--large organizations
   2. Emphasis on private networks for voice, data and image applications
   3. Services used for intra-company data communications, electronic document distribution, video teleconferencing
   4. Attractive for intra-company communications traffic throughout the United States
   5. CNS (Communications Network Service) is divided into CNS-A CNS-B for low-volume users with shared earth stations
   6. Message Service I is for switched, interstate voice communications service for large business users; Message Service II is for residential and small business users
   7. Monthly charges are $6,650-$17,850 for using dedicated earth station, $2,400-$2,550 for full-time transmission, 24 hours a day, 7 days a week, $2,250 for full business day transmission
   8. Installation charge is $1,000 each plus $13 per foot
   9. Address: Satellite Business Systems
      8283 Greensboro Drive
      McLean, VA 22101
      (703) 442-5000

d. SKYNET-AT&T
   1. Primary market--customers who require dedicated communication links
   2. Dedicated communication link for voice, video, data communications and facsimile transmission
   3. Simplex, half-duplex and full-duplex transmission is available
   4. Dedicated, high capacity, data transmission service via satellite between shared or dedicated earth stations
   5. Space segments cost $18,000 per month. Shared systems cost $1,500-$3,500 per month plus $2,000 per shared terminal Dedicated systems cost $13,000-$15,000 plus $90,000. There is also a one-time termination charge of $53,00-$62,000
   6. Address: AT&T Communications
      Badminster, NJ 97921
      (201) 234-4000

e. SPRINT--GTE Communications Corporation
   1. Primary market--business use, inter-city communications of various bandwidths and data speeds
   2. Microwave radio relay system which allows for transmission of voice, data, facsimile, telemetering, control and alarm features
   3. User can design a "custom package"
   4. Primary advantage is cost: $70-$100 per month access port, minimum usage is $250
   5. Address: GTE Sprint
      Minneapolis, MN
      (612) 333-2336

f. TELENET--GTE Communications Corporation
   1. Primary market--public network
   2. Consists of switching and network-access centers, transmission facilities leased from other common carriers, a network control center and network-access
   3. Private data network system also available to corporations and government agencies
   4. Packet switching
   5. Access through dial-in ports, private dial ports and dedicated facilities
   6. Available in all 50 states and foreign countries
   7. Used for economical remote access to in-house time sharing, text editing, management information and message processing
   8. Priced according to use, ranging from: $260 to $1,400 per month
   9. Address: GTE Telenet Communications Corporation
      8229 Boone Boulevard
      Vienna, VA 22180
      (800) TELENET

g. TYMNET--Tymshare, Inc.
   1. Primary market--large corporations
   2. Transmits only data communications, popular users are electronic mail and messaging
   3. Geared to low speed users--lower initial start up--use phone line or dial-in entry
   4. 384,093 miles of leased lines, used by more than 4,000 simultaneous terminal users
   5. Value added common carrier
   6. Costs are based on the length of time users are on the network, number of characters sent and the number of messages sent
   7. Claims to be the world's largest, most powerful and most sophisticated public packet network
   8. Typical coast-to-coast message costs about $.50 to $.75
   9. Address: Tymnet, Inc.
      2710 Orchard Parkway
      San Jose, CA 05134
      (800) 227-6185

6. Electronic Mail/Message/Voice Sytems via Wide Area Networks
   a. EasyLink--Western Union
      1. Primary market--businesses of all sizes
      2. Access to Western Union's computer via telephone
      3. Data of introduction--1982
      4. A computer based message system accessed by a multi-function terminal at user's site
      5. No installation or start-up cost required
      6. Includes access to the worldwide Telex network
      7. Messages can be sent internally or anywhere in the world
      8. Terminals can be any microcomputer word processor or other electronic devices--no compatibility problem
      9. Address: EasyLink Instant Mail Service
         P. O. Box 37472
         Omaha, NE 68137
         (800) 445-4444

   b. FAXPAX--ITT
      1. Primary market--business
      2. Wide-band facsimile network
      3. High speed transmission
      4. Packet switching, store and forward capabilities
      5. Access via analog or digital private lines or public dial-up lines
      6. 300 baud ASCII data terminals
      7. Deliveries can be made at any time regardless of terminals being busy or unattended, around the clock, seven days a week
      8. Service is priced per minute on a delivery priority basis

9. Evening rates are $.35 per minute, day rates are $.40 per minute
10. Address: Director of Marketing
ITT World Communications, Inc.
100 Plaza Drive
Secaucus, NJ 97096

c. MCI Mail--MCI Communications Corporation
1. Primary market--business
2. Computer-based message system (CBMS)
3. 14,500 mile cross-country network of lines
4. 15 MCI "post offices" throughout the United States
5. No minimum message requirements
6. Twenty-four satellite transponders
7. $1.00 per document fee, message is stored in MCI's mailbox until recipient's terminal accepts it or is delivered as hard copy as specified by user
8. Deliver four-page document with four hours for $25, overnight by noon--$6, first class--$2
9. Access by local phone or through a toll-free number
10. Address: MCI Communications Corporation
1133 - 19 Street NW
Washington, DC 20036
(202) 8/2-1600

d. ROLM PhoneMail System
1. Primary market--small and large businesses
2. Computer-based voice communications (CBVC) system
3. Access by local telephone
4. Introduced in December 1982
5. Transmits voice and data--synchronous or asynchronous--simultaneously over telephone wires
6. Can transmit at speeds up to 56Kbps
7. Message length, minimum--5 sec/min to maximum--varies
8. Purchase price--$70,000 to $185,000 (includes hardware and software)
9. Maintenace--$510-$1400 per month
10. Features:
a. Telephone answering
b. Message notification
c. Voice mailbox
d. Message forwarding
e. Message distribution
11. ROLM CBX is the hub of PhoneMail
a. Asychronous only
b. Speeds of 110-10,200 bps
c. full duplex
d. Interface uses RS-232C cable
12. Address: ROLM Corporation
Office Systems Division
4900 Old Ironsides Drive
Santa Clara, CA 95050
(408) 988-2900

e. TELEX--Western Union (Being replaced by EasyLink)
   1. Primary market--public and business
   2. Telephone line transmission
   3. Store and forward message service available
   4. Local access available in over 1640 exchange cities at a monthly flat rate
   5. Costs $.34 per minute, access line charges are $34-$44 per month
   6. International teletypewriter service
   7. Address: Western Union
      1 Lake Street
      Upper Saddle River, NJ 97458

f. TWX--Western Union (Being replaced by EasyLink)
   1. Primary market--public and business
   2. Message and data oriented
   3. Domestic teletypwriter service
   4. Access by leased line from customer premise
   5. Costs $.43 per minute, access line charges are $34-$44 per month
   6. Address: Western Union
      1 Lake Street
      Upper Saddle River, NJ 97458

g. VMX, Inc.--Voice Message Exchange
   1. Primary market--business
   2. Computer-based voice communications (CBVC) system
   3. Access by any telephone including WATS & PBX
   4. Date of introduction--1980
   5. Standard storage capacity--1200MB--for maximum system
   6. Voice storage capacity--82 hours--for maximum system
   7. User capacity--1,000--8,000 depending upon system
   8. Number of access lines depends upon system. The smallest system has 16; the largest system has 64. Can be networked
   9. Messages can be played up to three times
   10. Message length depends upon system configuration
   11. Basic functions: SEND, RECEIVE, REPLY, REDIRECT, BROADCAST
   12. Pricing:
      a. Purchase $195,000--$525,000
      b. Lease $40/month for minimum of 25 boxes and 800 calls
      c. Maintenance $25,000-$30,000 per year
   13. Address: VMX, Inc.
      1214 Columbia Drive
      Richardson, TX 75081
      (214) 699-1461

h. WING (Worldwide Integrated Communications Service) from Mohawk Data Sciences
   1. Primary market--medium to large businesses
   2. Computer based message system (CBMS)
   3. Two levels of desk-top terminals
      a. $6,000 Messenger--dedicated terminal with a built-in model
      b. $10,000 Series 21--includes extensive data and word processing features
   4. Options available:
      a. Automatic Mail--an automated collection and distribution service
      b. Mail Drop--which allows any communicating terminal to access all other WING terminals and services
      c. Direct Delivery--which automatically delivers messages to any communicating terminal that has an automatic answering device
   5. Every 15-90 minutes; Mohawk's center polls each terminal on the network for messages
   6. No message length restriction; however, 35,000 characters is recommended
   7. Messages may be sent to individuals, groups, or self
   8. Outside services accessed are Telex I, Telex II, International WING Service, IRC and British Telecom
   9. Compatible with other terminals including Wang and IBM
   10. Transfer of messages from terminal to terminal within the same building without having to go through Mohawk's network
   11. Subscription fee ranges from $20 to $200 per month per terminal plus usage. Probably will represent a 20% cost savings over Western Union's InfoCom
   12. Address: Mohawk Data Sciences
       Wilton, CT

A Sampling of Public Data Bases

1. Background
   a. There are well over a thousand on-line telecommunication vendors in the United States.
   b. Some are gigantic utilities offering vast libraries of data
   c. Most are modest bulletin board systems
   d. The big three on-line companies marketing information, communications, entertainment and a variety of other services are:
      1. CompuServe
      2. The Source
      3. Dow Jones News Retrieval Service

2. CompuServe
   a. Parent Company: H & R Block
   b. Over 110,000 subscribers
   c. Offer more than 1,400 services and features
      1. Special interest groups--more than 50 electric "clubs" get together on-line and exchange information on anything and everything
      2. Interactive games
         a. Megawars
         b. Adventure
         c. Space wars
      3. Encyclopedias
         a. Grolier's Academic American--9 million word data base with over 29,000 subjects
         b. World Block Encyclopedia--10 million word data base with 31,000 subjects
      4. CB Simulator
         a. A computer with about 40 channels
         b. Subscribers "chat" just like CB users
      5. College Board Advisor#
         a. On-line advice about selecting a college
         b. On-line advice about preparing for the SAT (Scholastic Aptitude Test)
      6. Shopping Services
         a. Comp-U-Store
         b. 60,000 brand-name items
      7. Business Services
         a. Information on 9,000 securities updated very 20 minutes
         b. Information on 40,000 stocks
      8. Information on Demand
         a. Information on products, places, things
         b. Access to professional research services
         c. Cost
            1. Registration fee $39.50--customers can sign up at local Radio Shack stores for only $29.95
            2. $12.50 per hour peak rate (5 a.m. to 6 p.m.)
            3. $6.50 per hour off-peak rate (6 p.m. to 5 a.m.)

3. The Source
   a. Parent Company: Reader's Digest Association, Inc.
   b. Over 60,000 subscribers
   c. Offer more than 1,200 services and features
   d. Major offerings
      1. Electronic Mail
         a. Each subscriber has a mailbox
         b. Letters may be sent, read and filed in an on-line storage area--faster and usually cheaper than long-distance telephone express delivery or facsimile

2. Computer Conferencing
   a. Conferences can include 2 to 200 participants
   b. Conferences can be started by anyone on the system
3. Electronic Bulletin Boards
4. Chat--like CB users
5. News and sports
   a. Associated Press Videotext service provides 250 daily dispatches on news, weather and sports
   b. Subscribers can search by keyword on the progress of bills in Congress
6. Shopping Services
   a. Comp-U-Store
   b. 60,000 brand-name items
7. Retrieval and Research
   a. Electronically order any book in print
   b. Summaries from 27 leading business publications such as Forbes, Venture and Harvard Business Review

e. Cost:
   a. Registration $100
   b. $20.75 per hour peak rate
   c. $7.75 per hour off-peak rate for evenings and weekends
   d. Call: 1-800-336-3366 for subscription forms

4. Dow Jones News/Retrieval
   a. Parent Company: Dow Jones
   b. Over 150,000 subscribers
   c. Major offerings:
      1. Access to 26 huge data bases in three categories
         a. Business and Economic news
         b. Financial and Investment services--Dow Jones quotes
         c. General news and information
      2. Encyclopedia--Academic American Encyclopedia
      3. News, weather, sports
      4. Shopping Services
         a. Comp-U-Store
         b. 60,000 brand-name items
      5. On-line reports--90 seconds old
         a. Wall Street Journal
         b. Barron's
         c. Dow Jones News Service
   d. Cost:
      1. Standard subscription fee is $75
      2. $72 per hour peak rate
      3. $54 per hour off-peak rate (6 p.m. - 6 a.m. weekdays and all day on weekends)
      4. Call: 1-800-257-5114 for subscription forms

Electronic Mail-Message-Voice Systems

1. Categories of electronic mail/message systems
   a. Facsimile (FAX--long distance dumb copier; transmits everything on page--words, pictures, graphics, signatures
   b. Communicating word processors (CWP)--document transmission between word processors (letters, memos, reports, messages)
   c. Computer-based message systems (CBMS)--alternative to telephone; message transmission to a display terminal
   d. *Computer-based voice communications (CBVC)--alternative to keyboard; voice message stored in electronic mailbox accessed by telephone

   *CBVC is not classified as an electronic mail/message system by some individuals since it involves voice input/output as opposed to keyboard orginated input/output.

2. Facsimile (FAX)
   a. Entered in the 1960's
   b. Transmits everything on page
   c. Information sent to compatible terminals only
   d. First machines were analog FAX units; today's are digital FAX which lends itself to computer control
   e. Categories of FAX units
      1. Group I
         a. 4-6 minutes to transmit page
         b. Approximately 105,000 units installed--largest and oldest group
         c. Growth rate of this group declining
         d. Over 60 documents a month and Group I FAX units are not cost justifiable
      2. Group II
         a. 2-3 minute transmission per page
         b. Growing at much faster rate than Group I machines
         c. Suited for moderately heavy operations up to 200 documents a month
      3. Group III and IV
         a. One minute or less transmission time
         b. Volume must be in excess of 300 documents a month to be cost justifiable
         c. Most technological emphasis on FAX machines within this group
         d. Group IV machines transmit digitally and can be linked to a computer
         e. Prime candidate for use in electronic mail systems that transmit FAX or messages
         f. Importance of computer controlled facsimile transmission

1. Before computer control, facsimile transmitted on deferred basis only
2. Transmitted via an electronic feed device that could be preset for sometime after the working day
3. System not foolproof--problems at night not solved until next day
4. Documents can be faxed over voice grade telephone lines on a real time basis; however, this cuts into valuable work time during the day
5. Increased costs for toll charges on daytime transmission

g. With computer controlled FAX, users have:
   1. Store and forward capabilities
   2. Functions with/without keyboard terminals
   3. Provision for a private line network, thus the internal voice network is not affected

h. Transmission options
   1. Switched and/or leased telephone lines
   2. Value added networks (Tymnet/Telenet)
   3. Microwave
   4. Satellites (SBS)

i. Value added network features
   1. Error free transmission by performing error checking
   2. Offer alternate routing
   3. Provide security check for someone accessing your line
   4. Conversation is documented
   5. Provides international service
   6. Keeps communication costs down

3. Communicating Word Processors (CWP)
   a. Entered in the middle to latter part of the 1970's
   b. Transmits whatever can be keyed at the word processing terminal
   c. Communication is terminal to terminal
   d. Protocols between and among terminals must be compatible otherwise third party interface is required
      1. Protocol translators
      2. Software
      3. Value added carriers
   e. Terminals must have appropriate communications software and/or hardware
   f. Communicating word processors will decline as standalone word processors are replaced with networked systems
   g. Transmission options
      1. Local area networks
      2. Switched and/or leased telephone lines
      3. Value added networks
      4. Microwave
      5. Satellites

4. Computer-based message systems (CBMS)
   a. Although the potential for CBMS has existed for years, serious consideration for these systems is related to the growth of executive workstations--late 1970's
   b. Communication originates at a terminal and sent to a computer where message is stored in an "electronic" mailbox and then accessed via a terminal
   c. CBMS's are software based
   d. Computers function round the clock--messages can be transmitted anytime
   e. Terminals must be compatible with the computer
   f. Prime users of CBMS are those who have need to transmit limited amounts of information
   g. Transmission options:
      1. Hardwired
      2. Local area networks
      3. Switched and/or leased telephone lines
      4. Value added networks
      5. Microwave
      6. Satellite

5. Computer-based voice communications (CBVC)
   a. Entered in the early 1980's
   b. Communication is from telephone handset to a computer--voice is stored in digitized format in an "electronic" mailbox and then accessed via a telephone
   c. CBVC systems require huge amounts of storage to convert voice to digitized format: e.g., a 200 word message requires 1,500 bytes of storage--a 200 word voice message requires 170 times that number of bytes (250,000)
   d. Computers function round the clock--voice messages can be transmitted anytime
   e. Messages can be sent from any telephone
   f. Senders and receivers of CBVC system messages do not have to keyboard
   g. Transmission options:
      1. Broadband local area networks
      2. Voice grade telephone lines
      3. Value added networks
      4. Microwave
      5. Satellites
   h. Partial list of Voice Messaging Companies
      1. GTE (Telemessenger)
      2. Genesis Electronics Corporation (CINDI)
      3. IBM (Ads)
      4. Octel (Aspen)
      5. Northern Telecom (IVMS)
      6. ROHM (PhoneMail)
      7. Tel-Star
      8. Voice and Data systems
      9. Voicemail International
      10. Votan
      11. Wang (DVX)
      12. Xerox (XVMX)

6. Comparison of electronic mail/message system categories
   a. The telephone:
      1. Typically 28% of all telephone calls are completed
      2. Telephone calls average 6-9 minutes with 3 minutes wasted before conversation begins
   b. With facsimile and communicating word processing, documents are prepared in the traditional manner even though they are transmitted electronically
   c. Computer-based message systems and computer based voice communications
      1. Save 30 minutes of wasted time per day for telephone calls
      2. Text/voice messages can be entered by managers
      3. Message sent by author directly to the recipient's electronic mailbox--unlike facsimile and communicating word processors where transmission is to a specific unit that may or may not be able to accept the transmission
      4. Each user assigned an electronic mailbox--information from CBMS system accessed via a display terminal or nondisplay keyboard with printer if hard copy is desired or from CBVC system via any telephone
      5. Eliminates telephone tag and telephone tyranny
   d. Genesis Electronic Corporation projects a company with 100 users would save $4,500-$19,400 per month by using voice mail based on a reduction in length of calls, rates, number of calls, clerical and mailing costs and personnel time

Electronic Document Based Filing Systems

1. Electronic document based filing systems
   a. Differs from data base systems--complete documents are retained
   b. An ideal system includes all documents
      1. Whether the source is internal or external
      2. Whatever the form--text, handwriting, voice, graphics, and/or pictures
      3. With the search, retrieval and storage associated with electronic speed and accuracy
      4. Plus the capacity to replace the need for hardcopy
      5. And is easy to use by all

2. Document generation alternatives
   a. Electronic keyboarding of documents originating in-house
   b. Telecommunication for entering incoming documents into the electronic filing system from remote locations
   c. Optical character reader (OCR) for entering incoming documents into the electronic filing system and for inputting documents generated in-house on non-electronic office systems
   d. Microfilming incoming documents and documents generated in-house on non-electric office equipment

1. Computer output microfilm (COM) for filming documents generated in-house
2. Computer input microfilm (CIM) for filming incoming documents for input to electronic filing system

e. Imaging of incoming documents via laser scanning devices that accept whatever is on the page--characters, signatures, pictures, charts, graphs. A page sized picture requires the same storage space as 10 pages of text
   1. IBM Scanmaster and Wang's PIC (Professional Image Computer) are examples of imaging devices that store data on magnetic hard disks--documents can be revised/altered
   2. CDC's LD1200 and KOM's Optfile are examples of optical digital disk systems where information is stored on nonerasable disks

NOTE: In a, b and c above, the electronic devices used are able to recognize individual characters--letters, numbers and symbols. Thus, it is possible to search through documents using a key word or word string. In d and e, capture documents as images and document search techniques are dependent on the indexes created.

3. Document storage alternatives
   a. Magnetic media (e.g., disk/tapes)
      1. Computer-quick retrieval
      2. Documents can be revised, deleted, moved
      3. Standard WP/DP equipment used or storage, retrieval and printing
      4. Document storage is $.05 per page--$20 per megabyte
      5. Since information can be altered, this medium would not qualify stored documents for legal purposes
   b. Microfiche/microfilm
      1. All types of documents easily stored whether picture, graphics, words or data
      2. Documents are in readable format and are recognized as legal alternatives to hardcopy
      3. Microfilm retrieval is slow when compared to other forms of media
      4. Special equipment is needed for viewing and imaging
      5. Document storage cost per page is .001 (1/10 of one cent--$.65 per megabyte of COM)
   c. Optical digital disks
      1. Computer-quick retrieval--1-2 seconds
      2. Once recorded, documents are "fixed" onto the media and on most systems cannot be altered--the automatic audit trail available on a write-once disk is the feature most likely to make it legally admissable in courts of law
      3. Special equipment required
      4. Storage cost per document is less than $.02 per page ($5 per megabyte) and by 1990, it is expected to drop to $.002 (2/10 of one cent or $10 per gigabyte)

4. Configuring alternative electronic filing systems
   a. Computer assisted retrieval (CAR) with microfiche/microfilm as the storage medium (potential for COM)--computer used for indexing and document retrieval
   b. Electronic keyboarding/imaging and OCR--documents retained on magnetic disks/tapes or optical digital disks
   c. Electronic keyboarding/imaging and CIM--documents retained on magnetic disks/tapes or optical digital disks
   d. Combination of CAR with "b" or "c" to eliminate hardcopy document storage and provide for high speed retrieval

A Comparison of Optical Disk Technologies for Office Automation Applications

1. Three Formats of Optical Storage Technology Using Disks
   a. Optical videodisc
   b. Optical digital (OD) data disk
   c. Compact disk (CD-ROM)

2. Need For Alternative Information Storage Systems*
   a. Ability to get information
   b. Faster access
   c. Retrieve only what is needed

3. Current Methods of Storing Information
   a. Books
   b. Reference manuals
   c. Microfiche/film
   d. Diskettes
   e. Magnetic tape
   f. Hard disk drives
   g. Hard copy (paper) systems

4. Laser Technology Development
   a. Optical means that data is stored and retrieved with a laser
   b. Prime users of laser technology
      1. Space
      2. Surgery
      3. Manufacturing
      4. Automated Office

5. Optical Storage Media
   a. Currently available in two forms
      1. Disk
      2. Card
   b. Under development--optical tape

6. Optical Storage Similarities
   a. Durable
   b. Consistent
   c. Error-free
   d. Random access
   e. High density storage
   f. Cost effective storage
   g. 25+ years' life span

7. Optical Disks Compared to Floppies and Hard Disks
   a. Floppy disks write data in circular tracks stacked 96 to the inch
   b. Hard disks - 800 tracks to the inch
   c. Optical disks - 40,000 tracks to the inch

   *The paper made from the pulp of 27 fir trees is equivalent to the storage capacity of one double sided 12-inch optical disk.

8. Components of an Optical Disk System
   a. Input device
   b. Optical storage system
      1. Hardware
      2. Media
   c. Computer for system integration
   d. Output devices
      1. Screen
      2. Hard copy (laser printer)

9. Optical Videodisk
   a. Technology
      1. Master is "etched" on disk with a laser
      2. Duplicates made in unlimited quantities
      3. Silver coated, 8-inch or 12-inch disks
      4. Stores up to 54,000 unique analog images (photographs, slides, films, graphics, computer generated text)
      5. Data can be stored in digital as opposed to analog format--up to a gigabyte (1 billion characters) per disk side
      6. Two audio tracks
         a. Can be used separately for narratives
         b. Used together for stereophonic sound
      7. Images are projected onto a TV monitor
   b. Features
      1. One image can remain on a monitor while the narrative continues
      2. Graphics generated by the computer can be imposed on the video image--thus, providing instructions, updating information, etc.
      3. A recent innovation allows the user to manipulate screen images
         a. Rotating
         b. Zooming in on a section
         c. Panning back and forth

c. Sampling of optical videodisc applications
   1. Company orientation
   2. New product announcements for distribution to branches
   3. Catalogs of supplies, hardware, software
   4. In-house newsletters
   5. Training
      a. Product service--technicians
      b. Product marketing--sales
      c. Operation and applications--employees/customers

10. Optical Digital (OD) Data Disk
   a. Technology
      1. Digitized data is "burned" into disk's surface with a laser beam either as holes, bubbles, or alterations to the physical state of the disk coating
      2. Error detection methods used
         a. DRAW--Direct Read After Write; disk must make a full rotation to verify that data is correct
         b. DRDW--Direct Read During Write; the data is read as it is written; speeds up recording process as a full disk revolution is not required
      3. Uses "WORM" technology-- W rite O nce/ R ead M any times
      4. Recording similar to existing magnetic media technology
         a. Sectors
         b. Tracks
      5. A 5-1/4-inch optical disk stores between 100 Mb and 200 Mb per side while a 12-inch optical disk stores a gigabyte (1 billion characters)--equivalent to 500,000 sheets of paper per side or the data stored on 50 or more reels of tape
      6. Used in conjunction with computer based systems hardware--e.g., workstations with keyboards and screens
   b. Features
      1. Storage density (10 times greater than magnetic media devices)
      2. Stores text and images on one media
      3. Rapid input (scans a page into the system in two seconds)
      4. High speed random access
         a. Movement from one section of disk to another virtually instantaneous
         b. Laser beam reads data written 50 billionths of a second earlier--magnetic tape requires two different heads to read and write simultaneously

5. Cost effective storage/one megabyte on-line
   a. $5 optical digital disk
   b. $40 magnetic hard disk
   c. $150 conventional tape drive
6. Flexible applications
   a. Large document filing systems with high speed scanners and printers
   b. Individual optical disk drives attached to standalone or networked

c. Sampling of optical digital disk applications
   1. Permanent audit trail for financial transactions (except in forthcoming erasable disk systems)
   2. Recordkeeping
      a. Warranty records
      b. Inventories
      c. Credit records for verification
   3. Central file server for LANs (Local Area Networks)
   4. Image storage and retrieval systems
      a. Engineering drawings
      b. X-rays
   5. Electronic document storage
      a. Alternative to office files
      b. Archival records
      c. Fixed disk backups
   6. Computer mass storage device for data bases

d. Examples of optical digital disk systems
   1. LD1200-CDC (Control Data Corporation)
      a. Write/read systems = $20,000
      b. DRDW recording technology
      c. 12-inch disk holds 1 gigabyte per side and costs $500--disk must be turned over to read side two
      d. Disk can be added to until it's full
      e. Index can be placed on the disk
      f. Laser scanned image and/or information stored is transmitted digitally to the system--thus, system stores voice, data, words, image and video information
      g. Interfaces with IBM PC--takes up one slot
   2. Optfile--KOM
      a. Write/read system = $18,500
      b. DRAW recording technology
      c. 12-inch disk holds 1 gigabyte per side and costs $375--must be turned over to read side two
      d. Write activity doesn't have to be completed all at once
      e. Index can be placed on the disk
      f. Company writes software for interfacing optical digital disk systems--theirs and others--with computer systems

11. Compact Disk/Read Only Memory (CD/ROM)
    a. Technology
        1. Master is "embedded" on disk with a laser
        2. Duplicates made in unlimited quantities
        3. Disk dimension is 4.72 inch diameter
        4. Released in United States in 1983 as an audio device
        5. In addition to the audio storage, the CD stores digital graphics and video images--black and white or color
        6. Stores 550 megabytes (550 million characters) of digitized data
    b. Features
        1. Extraordinary high density
        2. Small size
        3. Ability to store in three formats
            a. Video--see
            b. Text/image--read
            c. Audio--hear
        4. Potential use for distributed/decentralized office applications
    c. Sampling of compact disk applications
        1. Will impact office automation applications
        2. Mass distribution of application and operating system software
        3. Mass distribution of data bases
        4. Individual manipulation of data or application software
        5. Data search functions
    d. Example of CD/ROM characteristics on the DEC (digital equipment Corporation) CD reader
        1. Desktop unit--12" x 10" x 4"
        2. Supported by DEC's MicroVAX I, MicroVAX II or VAXstation II under the MicroVMX operating system
        3. CD/ROM disks are removable
        4. A one-second average access time
        5. 150,000 bps (bits) data transfer rate between reader and host computer
        6. Initial cost for replicated data is $100-$200 per disk (depends on volume) and prices will drop
        7. The DEC CD reader cost is $2,200--eventually price will be comparable to current cost ($600) of a 5-1/4" Winchester disk drive--CD reader cost expected to drop by 75%
        8. Disk capacity = 600,000,000 bytes of formatted data--text and/or graphics--equivalent to:
            a. 3-4 encyclopedias or
            b. 250,000 single typed pages or
            c. 1,600 conventional 5-1/4" floppy disks or
            d. 1,000 fiche cards or
            e. 50 times as much as 10 Mb hard disks or
            f. 46 days of data transmitted at 1200 baud over telecommunication lines

The Office in the Year 2000

1. All those working in offices will have display terminals with multi function capabilities (voice, data, word image and video processing activities) at their fingertips.

2. Any incoming correspondence that is not transmitted electronically will be converted to a digitized format via laser scanners and input into the electronic filing system. The documents will then be accessed via display terminals for action.

3. Documents created in-house will be dictated to the voice actuated display terminal.
   a. Words will appear on the individual's terminal display for editing and revisions by the author or support staff member.
   b. Words will be run through a dictionary and a grammar/syntax validator before the final draft is ready for distribution.
   c. Documents will be sent via electronic mail anywhere in the world.
   d. Duplicate copies will be automatically filed in the optical disk storage system.

4. All mail and messages (to include voice mail) will be stored in "electronic mailboxes" that individuals can access at any time.

5. Voice communications will be conducted via the display terminals.
   a. The receiver can identify the caller and the purpose of the call.
   b. The receiver decides whether to talk or to take a message by pushing a few buttons.

6. Business trips will become less necessary through full-motion video teleconferencing in two, three or a dozen locations.

7. While businesses will maintain a headquarters office complex for central control, more office work will be done by work group clusters in distributed office complexes in outlying areas that are specially wired and outfitted.

APPENDIX F

INTEGRATING OFFICE AUTOMATION CONCEPTS INTO BUSINESS EDUCATION CLASSES

Prepared By:
Dr. William Mitchell
University of Wisconsin-Eau Claire
Eau Claire, WI 54701

Required Components in Microcomputers for Multi-Functional Use

The Critical Components in Selecting a Microcomputer as a Multi-Function Work Station are to:

1. Identify what is to be done

2. Note the eventual user environment
   a. Single user
   b. Multi user/cluster
   c. Networked

3. Look for "off-the-shelf" software that functions in the environment described

   a. Accounting
   b. Word processing
   c. Data base management
   d. Graphics
   e. Spread sheet calculation
   f. Communication functions
      1. Electronic/mail messaging
      2. Electronic filing/document based management systems
      3. Document/file transfer
      4. Data base access
      5. Terminal emulation
   g. Personal management functions
      1. Calendaring/scheduling
      2. Tickler file
      3. Directories
   h. Voice input/output
   i. Protocol conversion
   j. Integrated
   k. Integrator
   l. Networkable

4. Check the software for common operating system to be used
   a. CP/M
   b. MS-DOS
   c. PC-DOS
   d. UNIX
   e. Xenix

5. Be aware of the impact of the microprocessor (chip) on performance (speed/flexibility)
   a. Number of bits processed at a time
   b. Bit capacity of the pathway
   c. Cycle speed expressed in megahertz
   d. Microprocessor manufacturers
      1. Intel
      2. Motorola
      3. National Semiconductor
      4. Western Electric

e. Example/Intel's microprocessors

1.	8088	IBM PC	16/8	4.77 Mhz
2.	8086	AT&T 6300	16/16	8 Mhz
3.	80186	Burroughs B26	15/16	8 Mhz
4.	80286	IBM PCAT	24/16	8 Mhz
5.	80386	Corvus 386 and Compaq 386	32/32	16 Mhz

6. Make sure there is sufficient main memory
   a. ROM
   b. RAM
      1. At least 256K for single function software
      2. 512/640K for integrated software
      3. 1 MB and up for network controllers

7. Go over the keyboard/input requirements
   a. 10-key pad
   b. Labeled function keys
   c. Soft keys
   d. Touch pad
   e. Other input devices
      1. Speech recognition attachment
      2. Bar code wand
      3. Graphics tablet and pen
      4. Mouse
      5. OCR

8. Review screen needs based on use
   a. 24 or more lines
   b. 80 column display (horizontal scrolling)
   c. Display
      1. Green on dark background
      2. Black on white background
      3. White on black background
      4. Amber on gray or dark background
      5. Color
   d. Graphics
   e. Touch screen

   NOTE: The higher the pizel count the more vivid the image--e.g., 640 by 400 vs. 320 by 200--for CAD/CAM and high resolution graphics 1,000 by 1,000.

9. Plan for sufficient secondary storage and backup
   a. Diskettes--5-1/4" (flexible)
      1. Single-sided/single density (80-90K)
      2. Double-sided/double density (360K)
      3. Double-sided/quad density (1.2Mb)
      4. Other diskettes--e.g., HP's 3-1/2"/Bernoulli 8" (cartridge)
   b. Disks--5-1/4" (rigid)
      1. Hard disks
         a. Fixed
         b. Removable

2. Hard disk cards
   a. Diskard, Tandon Corp (21 Mb; $995)
   b. DriveCard, Mountain Computer (10 & 20 Mb; $1,09; $1,195)
   c. EasyCard, Microscience International Corp (20 Mb; $1,095)
   d. FileCard, Western Digital (10 Mb; $895)
   e. Hardcard, Plus Development (10 Mb; $1,095)
   f. Onboard, Maynard Associates (10, 20 Mb; $975; $1,195)
   g. Scorecard, Systems Peripherals Consultants (20 Mb; $895)

c. Optical disks
   1. CD/ROM (compact disc/read only memory)
   2. Optical digital disks

d. Backup
   1. To backup a 10 Mb disk with DOS--1 hour and 28 to 29 diskettes
   2. Software available for high speed backup--15 minutes for 10 Mb plus diskettes
   3. Tape drivers/cartridges/cassettes backup--3-6 minutes for 10 Mb on one reel, cartridge, or cassette
   4. Examples follow:
      a. Backpac International Corp.--BP+45, 54 Mb, cassette, (515) 448-4965
      b. Hewlett-Packard--9142A, 15 or 60 Mb, 1/4 inch cartridge, $1,990, (800) 367-4772
      c. Maynard Electronics--Mainstream 20, 20 Mb, 1/8 inch cassette, $1,395,(305) 331-6402
      d. Sigma Designs--ORT (One Reel Tape)-010, 10 Mb, 1/2 inch spool (tape), $945, (408) 943-9480
      e. Tecmar--QIC-60H, 60 Mb, 1/2 inch cartridge, $2,144, (216) 349-1009

10. Select a Printer
    a. Dot matrix ($.005 to $.02 for non-letter quality to near letter quality)
    b. Ball (outmoded)
    c. Wheel printer ($.01 to $.09 for fabric ribbon on low end to single strike carbon ribbon on high end)
       1. Daisy
       2. Thimble
       3. Crown
    d. Ink jet ($.005 to $.11 using ink cartridge and regular paper to special paper on the high end)
    e. Plotter
    f. Laser ($.025 to $.03 and price is dropping--other considerations are speed, noise reduction, and maintenance free operation)

11. Include communicating capabilities
    a. Hardware (board)
    b. Software
    c. Modem
        1. Internal
        2. External

IMAGE PROCESSING PRINTERS

1. Categories
    a. Impact
        1. Dot matrix
        2. Wheel (daisy, thimble, crown)
        3. Ball (outmoded)
    b. Non-impact
        1. Ink (limited)
        2. Laser
        3. Plotters (graphics)
        4. Thermal transfer (popular with portables)

2. Market Penetration
    a. In 1981 impact printers had 98% of the market--2% for non-impact
    b. By 1985 impact printers dropped to 89% of the market with 11% for non-impact

3. Cost comparison for various types of printers
    a. Dot Matrix-$.005 to $.02 for non letter quality to near letter quality
    b. Wheel--$.01 to $.09 for fabric ribbon on low end to single strike carbon ribbon on the high end
    c. Ink Jet--$.005 to $.11 using ink cartridge and regular paper to ink cartridge and special paper on the high end
    d. Laser--$.025 to $.035 and price is dropping (other considerations include speed, noise reduction, and maintenance free operation)
    e. Plotter--$.20 and up
    f. Thermal transfer--$.005 for non letter quality to letter quality

4. Printer Characteristics
    a. Dot matrix printers
        1. Definition--image created by electronic signal from the computer that causes selected pins to impact a ribbon positioned in front of a sheet of paper
        2. Generally have 9, 18, 24, or 27 pins--output quality/quantity related to the number of pins
        3. Speed ranges
            a. Rough draft--40 to 700 cps (30 cps is roughly 1 page per minute) with 100-400 cps most common
            b. Near letter quality--15-135 cps with 25-75 most common

4. Price range $150 to $2,500
5. Used primarily for rough draft and near letter quality text and graphics output--color printing now available

b. Daisy wheel printers
   1. Definition--image created by an electronic signal from the computer that "hammers" the petal containing the appropriate character into a ribbon positioned in front of a sheet of paper
   2. Daisy wheel elements generally have 88 or 96 petals (stems) each having a character at the end consisting of upper/lower case letters, numbers and symbols (those with 128 characters have 64 petals with 2 characters per petal--wheels come in plastic or metal)
   3. Speed range 20-60 cps
   4. Price range $500-$2,000
   5. Used primarily for letter quality output, graphics generally not available, cut sheet and envelope feeders are common

c. Laser printers
   1. Definition--image created by digitized input into the same or modified form for hard copy or digitized format via laser technology Light Amplification by Stimulated Emission of Radiation)--combines laser and zerographic technolgies (the laser, under computer control, imprints document's image on a zerographic drum, which then transfers it with dry ink to standard paper via a heat process--an alternative is ion deposition that is pressure sensitive as opposed to the heat process.)
   2. Laser engines--3 year old technology, developed by Cannon, designed originally as a copier unit, used in HP Laserjet, life expectancy 100,000 pages (newer laser engines were designed from the start to be printers with increased life expectancy, e.g., the Ricoh engine is rated at 600,000 copies.) Laser engine manufacturers include:
      a. Canon
      b. Hitachi
      c. Konica
      d. Mita
      e. Ricoh
      f. Zerox
   3. Speed ranges 6-12 pages with 8 and 10 pages most common--a 10 ppm output is equal to 300 cps
   4. Price range $1,995-$6,000
   5. Used primarily for letter quality output, graphics, quiet operation, faster high quality output, wider selection of print styles, plus some units include a copier feature

5. Laser printer compared to a copier
   a. Accepts electronic signal input as opposed to a hard copy image
   b. Contains resident fonts and format alternatives
   c. Includes input-output devices to allow communication within a network
   d. Possesses a significant amount of buffer memory--important for queuing and serial transmission of copy to be printed e.g., 300 baud (bps) is comparable in speed to 30 cps--a 10-page per minute laser is printing 300 cps or the equivalent of 3000 baud

6. Sampling of laser printers on the market
   a. CIE LIPS 10
      1. Konica engine
      2. 10 ppm
      3. $3,495 list price
      4. Emulates Diablo, Epson, HP Laserjet
      5. Front panel with controls, easy to install and maintain, comes with a proprietary language for drawing boxes, bar codes, pie charts
   b. QMS Kiss
      1. Canon engine
      2. 8 ppm
      3. $1,995 list price
      4. Emulates Diablo 630 Qume Sprint, Epson FX-80 (includes graphics and downloadable fonts)
      5. Comes with parallel interface
   c. Qume LaserTEN
      1. Hitachi engine
      2. 10 ppm
      3. $2,795 list price
      4. Emulates IBM Proprinter, Qume, Epson, HP Laserjet and Laserjet Plus (graphics)
      5. Uses a null modem cable for PC communication through its serial port, user maintainable, 3 paper sizes and 2 feeder trays
   d. Zerox 4045 Laser CP
      1. Xerox engine
      2. 10 ppm
      3. $4,995 list price
      4. Emulates Diablo 630 and Zerox 2700
      5. Includes the copier option for $400, can use up to 22 fonts on one page, weighs 160 lbs.--60-80 lbs. heavier than most desktop laser printers

7. Additional background on laser printers
   a. Most lasers have a 300 dpi print resolution
   b. Toner must be added every 4,000-6,000 copies (equivalent to $.01 per copy at retail cost)
   c. Tune-up/developer needed after 30,000-40,000 copies, e.g., tune-up kit for the Qume LaserTEN retails for $590

d. Laser printers can be used to reduce/replace the need for copies where less than 10 copies of documents keyed inhouse are required
e. Parallel vs. serial transmission of information to be printed must be considered--information over telephone lines, on LANs and generally distances over 15 feet between keyboard unit and printer requires serial transmission
f. Lasers are not limited to desktop units--e.g., the Zerox 9700 Copier/Printer is rated at 120 ppm (2 pages a second), duplexes (prints on both sides of a page), and costs over $300,000

8. Why laser printers will grow
   a. Costs keep dropping--now below $2,000
   b. Choice of font by user (intermix typefaces and sizes within a line)
   c. Print at speeds of 6 to 120 pages per minute (4 to 100 times faster than a daisy wheel printer)
   d. Printers operate at low noise level--below 55 decibels
   e. Merge data from various electronic sources
   f. Only one electronic input needed regardless of reproduction quantity or format
   g. Portrays alphabetic, numeric, and symbolic characters
   h. Some lasers will reproduce images to include characters, pictures, signatures, and graphics
   i. Can communicate with other printers
   j. Reproduce hard copy at local or distant sites via communication lines, without user intervention
   k. Have the potential to replace single-function devices, such as photo typesetters, platemakers, copiers, facsimile, and addressing and labeling equipment
   l. Will play a key role in Office Automation

IMAGE PROCESSING
COPIERS/DUPLICATORS

1. Copier definitions
   a. Copier--reproduces original document (hard copy) in same form even if reduced
   b. Copier/duplicator--reproduces document in same form even if reduced

2. Copiers versus traditional duplicators
   a. Zerographic copiers marketed originally on lease basis only with a monthly fee based on copies produced--economical, up to 20 copies
   b. Spirit duplicators generally served the 20-150 copy range
   c. Stencil duplicators addressed the 150 to 500 copy requirement
   d. Offset duplicator/printers used for copies in excess of 500

e. With the expiration of the Zerography patent, other manufacturers marketed the process as a saleable rather than lease only product--this event made the copier (duplicator) an economical alternative to spirit and stencil duplicators

3. Categories of Copiers
   a. Low/Mid volume copiers
      1. Below 40 copies per minute
      2. Up to 35,000 copies per month
      3. Price range generally $1,000-$5,000
      4. Table top design
      5. Dominated by foreign manufacturers
   b. High volume copiers
      1. 40-120 copies per minute
      2. 35,000 to over 100,000 copies per month
      3. Console design
      4. Dominated by domestic manufacturers

4. Copier features
   a. Paper handling
      1. Manual
      2. Semi-automatic
      3. Automatic
   b. Duplexing (copies on both sides of paper--reduces paper costs up to 40%)
   c. Reduction (2 or more modes)
   d. Enlargement (2 or more modes)
   e. Paper tray capacities (table top models)
      1. Primary (500 sheets common)
      2. Auxiliary (250 or more sheets)
   f. Color now available

MICROCOMPUTERS--SEVEN MACHINES IN ONE

With appropriate software each unit becomes a:

1. Electronic/electric typewriter

2. 10-key calculator

3. Word processor

4. Computer

5. Electronic filing system
   a. Data base
   b. Document based

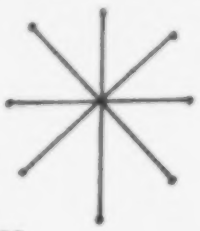
6. Communicating device
   a. E-Mail
   b. Document/File distribution
   c. Information access

7. Tutorial/Computer Assisted Instruction (CAI) system

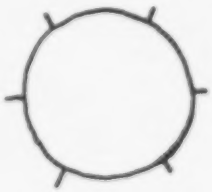
LOCAL AREA NETWORKS (LANS)

A local area network is a communications system that interconnects computers (includes micros, minis and/or mainframes), terminals, secondary storage devices, printers, and other peripherals in a limited geographic area. Devices attached to the network are called nodes. The LAN consists of 5 components--topology, media, method, access and interfces.

1. Topology/Architecture--physical structuring or configuration of the network
   a. Star Network



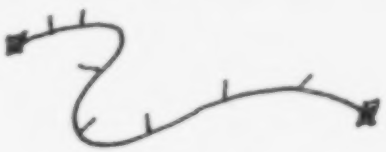
      1. Characteristics
         a. Connects components through a central processor such as a CBX, PBX, a controller, or a host computer
         b. Point-to-point communications through a central controller and attached nodes (e.g., terminals, printers, etc.)
         c. Most familiar local communications topology--e.g., telephone applications (CBX/PBX) and traditional computer timesharing environment
         d. Most star-shaped networks marketed by telephone interconnect vendors
      2. Advantages
         a. Less vulnerable to the failure of connected components
         b. Suited to dumb terminals
         c. Single wire connection
         d. Easy fault detection and isolation
         e. High security is possible
      3. Disadvantages
         a. Star networks vulnerable to central processor failure
         b. Architectural limitations (number of nodes/distance from central controller)
         c. Excessive responsibility of one machine--the controller
         d. Requires a line for every node; adds the cabling costs
   b. Ring Network



1. Characteristics
   a. Generally information is passed in one direction
   b. All nodes are connected to other nodes and communications pass through every node
   c. Messages are usually passed completely around the ring and returned to the sender
   d. Each access node detects beginning and end of message
   e. Each access node is capable of inserting its own message into the traffic stream
2. Advantages
   a. Dependence on central controller is eliminated
   b. Successful message delivery is acknowledged
   c. Access is guaranteed, even when the ring is heavily loaded
   d. Broadcasting to all nodes is easy
   e. Error rate is low
3. Disadvantages
   a. If ring is broken, a one-way network will not operate
   b. Ring networks must be connected at both ends--a matter that could complicate the wiring process
   c. As more nodes are installed, it affects the time that it takes for information to travel around the ring
   d. New nodes cannot be installed while the network is actually operating

   NOTE: There is another form of ring network referred to as a loop. In this topology, all nodes are connected together in a ring, but one of them controls the rest, and determines which should use the communication channel.

c. Bus Network



1. Characteristics
   a. Series of linear connections that tap into the network at various points
   b. All nodes share the same channel
   c. Each node broadcasts its message throughout the network so that all nodes hear all messages
   d. There is no master controller
   e. A terminator must be placed at each end
2. Advantages
   a. Initial installation costs are reduced--master controller not needed
   b. Network usually handles a large number of nodes
   c. Increasing the number of nodes does not affect transmission speed
   d. It is easy to attach devices

3. Disadvantages
   a. The complexity of the multi-access bus network device(s) needed to referee cable use is a potential shortcoming
   b. It may be necessary to add signal repeaters for longer cable runs
   c. Reliability of network can be hampered by malfunctioning nodes that jam the network

d. Tree Network

1. Characteristics
   a. Series of linear connections in which a branch may be established at any point and continue in any direction
   b. The tree topology is essentially a series of buses connected by a trunk or stem
   c. Also known as a hierarchial network
   d. A number of devices are clustered together under a node
   e. Message traffic is routed "up" to the appropriate node and then routed "down" to the intended destination
2. Advantages
   a. Distributed control
   b. Ability of system to function despite the failure of an attached system
   c. Capability of adding and subtracting workstations and peripherals without reconfiguring the system
3. Disadvantages
   a. Without central control, the referee mechanism must be distributed to each attached system
   b. Attached systems must contend with one another for the shared pathway

e. Hybrid Network
There are other network configurations in addition to the four described. In some cases these networks represent combinations of the network topologies described and are completely different or are combinations of one or more LANs and PBX.

2. Transmission Media--the physical path for the network
   a. Twisted-pair wires (telephone wire)
      1. Least expensive
      2. Wire is pliable
      3. Usually limited bandwidth (in most cases one activity at a time--there are a few LANs capable of transmitting voice and data simultaneously)

4. Limited distance without repeaters (1-3 miles)
5. With the development of ISDN, there is a renewed acceptance of twisted-pair wire as a transmission medium

b. Coaxial cables
1. Large bandwidth capacity (voice, data/words, video imaging) can take place simultaneously
2. Suitable for reasonably long distances--up to 50 miles
3. Cable is more expensive than twisted-pair wires

c. Optical fiber
1. Newest transmission media--once technology matures, optical fiber will be less costly than coaxial cable
2. Offers widest bandwidth capacity
3. Some limitations in interface technology--e.g., tapping into the fiber; current use is point to point
4. Now becoming a viable alternative in the LAN market

d. Space
1. With the use of optical link devices, information is transmitted between LANs--e.g., infrared beams, microwave transmission
2. Used to cross right of ways and/or to reduce wiring costs--transmission is limited to line of sight

3. Transmission Method--manner that the signal is carried

a. Baseband Network
1. Characteristics
a. Generally involves contention of nodes for one digital pathway
b. Transmission speed ranges from 1 Mpbs to 50 Mpbs
c. Typically uses twisted-pair wire otherwise 3/8 inch coaxial cable
d. Usually limited to less than one to three miles
e. Not compatible with video
2. Advantages
a. Network interface and taps are inexpensive by comparison to other alternatives
b. Modems not needed for digital transmission
c. Technology is fairly simple--users do not have to be telecommunications specialists
3. Disadvantages
a. Limited scope of applications (in most cases word/data transmission--voice is included in some cases)
b. Not conducive to video communications
c. Cannot handle simulteneous multiple transmissions

b. Broadband Network
   1. Characteristics
      a. Signal is carried on a radio-frequency (RF) carrier
      b. Uses common cable television (CATV) cable or optical fiber
      c. Multiple channels of communication
      d. Modems are used
      e. Transmission can extend tens of miles
      f. Trend toward broadband networks--especially via optical fiber
   2. Advantages
      a. Can be used for word/data, voice and video transmission
      b. Flexibility and multifunctionality are system features
      c. Accommodates contention protocols (methods of getting on the cable)
   3. Disadvantages
      a. High cost of modems and cable access devices
      b. Additional hardware (beyond cable) required
      c. Overdependency on one network for word/data, voice, and video services
      d. Tend to be complex with higher initial cost than baseband networks
      e. Considerable design, installation and support costs

4. Network access--procedures by which an attached device gains entry to transmission media
   a. Dedicated access--involves prespecified allocations of resources
      1. Types of dedicated access methods
         a. Time division multiplexing (TDM)--vertical slicing of bandwidth
         b. Frequency division multiplexing (FDM)--horizontal slicing of bandwidth
         c. Space division multiplexing (SDM)--associated with optical link transmission, each node is allocated a prescribed amount of space in which to transmit
      2. Characteristics of dedicated access methods
         a. Wasteful use of resources
         b. Inflexible for most office and data processing environments
   b. Polling access--a host polls dispersed nodes
      1. Types of polling access methods
         a. Roll-call polling--
            (1) Managed by central supervisor
            (2) Each device is interrogated sequentially
            (3) Used in star, tree, bus networks

b. Token-passing
(1) Token (message) is transmitted from node to node
(2) Primarily used with ring-topology

2. Characteristics of polling access systems
a. Master controller initially is the only one to talk
b. Controller function is to ask each node if it has an information packet to transmit--if so, it is relayed to destination, otherwise controller proceeds to next node
c. A percentage of the time is wasted on the network by the accessing process

c. Contention access--each node attempts to transmit whenever it has something to send

1. Types of contention access methods
a. Carrier sense multiple access (CSMA)
(1) Transmitting node "listens" for a signal
(2) Transmits in a silent period
(3) If another device transmits at the same instant, the messages collide and are corrupted. The devices transmit their messages in their entirety before being aware of the collision and thus must retransmit
b. Carrier sense multiple access with collision detection (CSMA/CD)
(1) Transmitting node "listens" for openings
(2) Transmits in a silent period
(3) If a collision occurs, transmission stops immediately and each device hesitates for a different time period and then retransmits. In CSMA/CD devices are actually monitoring the transmission activity

2. Characteristics of contention access systems
a. Random access to transmission media
b. No prior scheduling or approval needed by a central controller
c. Chance of interference

5. Network interfaces--requires hardware and software considerations
a. Hardware
1. Firmware (cards/boards) for terminals, printers, etc.
2. Tap devices/cable connectors
b. Elements related to software protocols/communication
1. Code set--represents the unique series of bits to represent each letter, number, and symbol
a. ASCII 7 and ASCII 8 represent two popular code sets that use 7 and 8 bits respectively for letters, numbers, and symbols (ASCII stands for American Standard Code for Information Interchange)

b. EBCDIC is an 8 bit code developed by IBM and stands for Extended Binary Coded Decimal Internal Code

c. Be aware that there is an EBCDIC code for WP and one for DP. There are 16 additional codes that exist in word processing that do not normally exist in data processing--e.g., required hyphen, required backspace, required underscore, and tab.

NOTE: While two devices from different manufacturers may have the same code set, compatibility is still a problem. Two devices may have the same bit configuration for letters and numbers, but selected symbols and format codes may have different bit sequences.

2. Method of transmission--how information is transmitted differs. In some cases the information is transmitted letter by letter. In other cases information is transmitted in its entirety.

a. Asynchronous--a method of transmission whereby characters are transmitted so that there is a start and stop bit preceding and following the bits being transmitted to represent a letter, number, or symbol. For example, in ASCII 8, 10 bits are required to transmit each character: 8 bits for the character and the start bit and the stop bit.

b. Synchronous--a method of transmission whereby a series of sync bits are transmitted at the beginning of a message. Thus in an 8 bit code only 8 bits are transmitted per character.

c. Bisynchronous--a method of transmission developed by IBM that has the same characteristics as synchrononous transmission

3. Speed of transmission--Relates to the bits per second (bps) that the information travels. For example, information that is sent on analog telephone lines between two devices attached to modems travels between 50 bps and 9,600 bps (other popular speeds are 300, 1,200, 2,400, 4,800). Speeds of 19,200 bps are possible via analog transmission over leased lines. Asynchronous transmission is usually 2,400 bps and down while synchronous transmission is 2,400 bps and up.

NOTE: Digital transmission speed over telephone lines is 56,000 bps to 64,000 bps.

4. Mode of transmission--refers to the communication pattern

a. Simplex transmission--one-way communication; one device sends and one or more receives--Radio and TV transmission are examples of this type of transmission.

b. Half duplex--communication goes both ways but only one device talks at a time. A CB radio is an example of half duplex transmission.
c. Full duplex--communication goes both ways at the same time. A telephone is an example of full duplex transmission.

5. Bandwidth--range of freqencies within a communication band expressed in hertz (Hz)--units of freqency equal to cycles per second (a television channel occupies 5 MHz)
   a. Narrow bands--0 to 300 Hz
   b. Voice bands--300 to 3000 Hz
   c. Wideband--over 3000 Hz

6. LAN overview
   a. Function
      1. Voice communication
      2. Data/word communication
      3. Video communication
      4. Combination of voice, data/word, video
   b. Geography
      1. Single building
      2. Adjacent buildings
      3. Nonadjacent buildings within 50-mile radius
   c. Transmission media
      1. Cable
         a. Multi-twisted pair
         b. Coaxial
         c. Optical fiber
      2. Microwave
         a. Analog
         b. Digital
      3. Other wireless transmission techniques--e.g., infrared light beams
   d. Communication standards for LANs--protocols--a set of compatibility instructions
      1. Common protocols (sampling)
         a. SNA/SDLC
         b. RS 232C
         c. TTY
         d. 2741
         e. 2780
         f. 3270
         g. X.25
      2. Other forms of protocol
         a. Assigned space on bandwidth
         b. Time slot on a data stream
         c. Protcols designed by users
      3. Groups working on protocols
         a. ANSI
         b. EIA
         c. IEEE
         d. CCITT (International)
         e. ISO (International)
         f. ITU (International)

e. Local network design criteria
   1. The network must be transparent to the user
   2. Configuration should permit logical interconnections
   3. Must perform efficiently in shared environment, offering a range of applications
   4. Must be flexible
   5. Must be reliable
   6. Security, maintenance and other administrative concerns must be provided for
   7. Costs must be minimal

Editor's Note:

The following Appendix is offered as a sample for developing a proposal of factual data/rationale for school boards, administration and community when planning for transition into the 21st Century. The magnitude and dollars could be scaled to one's individual needs and resources.

APPENDIX G

Sample Proposal for a
Networked Microcomputer Based
Office Automation Instructional Classroom/Laboratory

Sumbitted to:

University of Wisconsin-Eau Claire
Revised August 26, 1986

Prepared by:

Dr. William Mitchell, Professor
on behalf of the
Department of Business Education and Administrative Management
University of Wisconsin-Eau Claire

PROPOSAL FOR A NETWORKED OFFICE AUTOMATION LABORATORY

Background

Information age technology to include: electronic integrated information systems, high speed telecommunication links, and office automation software is available today. The above represent critical components of the subject matter presented in Business Education Administrative Management courses. These components are covered primarily by talking about them and a smattering of hands-on applications.

Problem

Of the 41 regularly scheduled courses taught by faculty in the BEAM Department during the 1986 spring semester, only two courses were conducted in a classroom that had computer based equipment. For all other courses the students were required to use out-of-class-time to vie for electronic equipment where the ratio of UW-EC students to these workstations exceeds 30 to 1.

Dr. Mike Yohe, former Director of Academic Computing, and his staff were instrumental in "keeping us afloat" by providing opportunities for electronic mail and file creation on the Honeywell computer and text editing applications on microcomputers in the open labs.

The BEAM Department has pursued a "band-aid" approach in providing computer applications, hands-on experiences for the students served. This approach has been a stop-gap measure at best. Imagine an individual preparing to be a pilot with only occasional opportunities to get into the cockpit of a plane.

A proposal for a networked microcomputer was submitted to UW-EC Administration in March 1986. A portion of the proposal was funded ($26,819) which was used to purchase 16 microcomputers and a laser printer. While this investment will provide a measure of relief, it will be immediately overtaxed and does not provide a communication link and office automation features associated with a networked system.

Solution

The solution to our dilemma is to add 24 microcomputers to the 16 purchased in August 1986, and link them via a local area network with fault tolerant characteristics. In addition, purchase 2 more letter quality laser printers with graphics, install the networkable integrated office automation software purchased in July 1986, invest in a site license for the OA software and provide a link to the Honeywell DPS 8/49 UW-EC Academic Computing facility.

Investment

The total system cost to include hardware, software communication links, and implementation lists for $126,641.16. Should funds not be available to install the complete system, it could be divided into two phases--phase 1 with 16 microcomputers, 1 laser printer, 1 LAN and a site license for the integrated OA software lists at $72,371.43.

Implementation

The proposed office automation classroom/laboratory is designed as follows: for security, the system controllers, file servers, hard disks, one workstation and 2 laser printers are to be placed in SSS204A. No special environmental conditions are required by the system. Twenty-one workstations are to be placed on the desks in SSS204. The desks presently in the room are ideal for the proposed workstations. In addition, there are three 2 x 4" tracks in the floor for running cable into the systems boxes located in SSS204A.

Ten workstations are to be placed in SSS202. Ideally, a door is to be placed between SSS204 and SSS202 to eliminate the need to go into the hallway for movement between rooms and also to maximize security and monitoring functions. The other workstations are to be placed in the offices of the BEAM faculty located on the 4th floor.

For cost justification reasons, the need for concurrent processing and system expansion and flexibility (software, hardware and opportunities for telecommunication), a networked microcomputer based system was selected. The system components consist of a Novell Netware star topology LAN to include: software, hardware and communication links; Zenith microcomputers; Qume LaserTen printers; and Smartware--an integrated office automation software from Innovations, Incorporated. Other networked software packages will be added as needed.

Justification

The installation of the proposed classroom/laboratory facility provides the following in-class, hands-on applications for students:

A. Electronic mail creation/distribution within the lab or campus wide through the link with the Honeywell

B. Document based electronic filing and distribution

C. Database creation, query and upgrading

D. Spreadsheet functions, automatic calculation and graphics

E. Word processing functions to include document formatting, revision, editing, spelling verification, merge functions, sorting and forms design

F. Personal management functions such as electronic calendaring, scheduling and tickler file activities

G. System management functions for start up, security, administration and monitoring.

The BEAM faculty will have the same opportunities plus be able to monitor student progress and have system access outside of scheduled class time.

The classes (based on the spring semester, 1986, schedule) that are to be scheduled in the OA classroom/laboratory are as follows:

#	*BEAM 120,	1	section, per	25 section
#	BEAM 135,	6	section, per	22 section
#	*BEAM 271,	2	section, per	20 section
#	*BEAM 300,	1	section, per	20 section
	BEAM 305,	10	section, per	32 section
	BEAM 306,	1	section, per	25 section
	*BEAM 315,	3	section, per	32 section
	BEAM 316,	3	section, per	32 section
	*BEAM 425,	1	section, per	25 section
	*BEAM 426,	1	section, per	25 section

* With the additional microcomputers, the enrollments in BEAM 120, 135, 271 and 300 could be increased to 32 students in each section.

* These classes are to be scheduled totally in the OA classroom/laboratory facility. The remaining classes are to be scheduled on an alternating class period basis so that all sections can be accommodated.

Commitment

In keeping with UW-EC's commitment to excellence, the proposed office automation classroom/laboratory facility is a "must."

Itemized Costs

The following represents system costs and is divided into two plans. Plan 1 includes the costs for a one-phase total system implementation. Plan 2 represents the first phase of a two-phase implementation plan.

Plan 1 - Total System Implementation

Hardware

	Description	Unit Price	Total
2	Netware/S-126 File Server	21,395.00	42,790.00
2	4 MB Memory Board	2,995.00	5,990.00
2	4 Port Parallel/Serial	699.00	1,398.00
6	Lan Cards for (6) Users	1,995.00	11,970.00
32	NIC Network Interface Cards	250.00	8,000.00
8	Network Supervisors Manuals	60.00	480.00
4	500' Cable	189.00	756.00
96	Connectors and Hoods	9.95	955.20
2	Shipping and Insurance on LAN (2%)	556.98	1,113.96
24	ZW-158-43 20Mb Hard Disk & a 360K Diskette Drive Serial/Parallel Port 512K RAM Full Color/Full Graphics 4.77/8.00 MHZ Adjustable Clock Speed MS-DOS 2.11	1,452.50	34,860.00
24	ZVM-1220 Amber Monitors	106.00	2,544.00
24	Shipping (CPU & Monitors)	29.00	936.00
2	Qume LaserTen Printers	2,784.65	5,569.30
	Subtotal (Hardware)		117,362.46

Software

	Description	Unit Price	Total
40	Smartware Site License *	200.00	8,000.00
	Subtotal (Software)		8,000.00

* Site license is an estimate

Installation and Training

30	Hours of Installation & Training	35.00	1,050.00
	Subtotal (Installation & Training)		1,050.00
	Total System Implementation		126,412.16

Plan 2 - Phase 1 of a 2 Phase Implementation

Hardware

	Description	Unit Price	Total
1	Netware/S-126 File Server	21,395.00	21,395.00
1	4 MB Memory Board	2,995.00	2,995.00
1	4 Port Parallel/Serial	699.00	699.00
3	Lan Cards for (6) Users	1,995.00	5,985.00
16	NIC Network Interface Cards	250.00	4,000.00
4	Network Supervisors Manuals	60.00	240.00
4	Network Users Manuals	60.00	240.00
2	500' Cable	189.00	378.00
44	Connectors and Hoods	9.95	437.80
1	Shipping and Insurance on LAN (2%)	556.98	556.98
16	ZW-158-43 20Mb Hard Disk & a 360K Diskette Drive Serial/Parallel Port 512K RAM Full Color/Full Graphics 4.77/8.00 MHZ Adjustable Clock Speed MS-DOS 2.11	1,452.50	23,240.00
16	ZVM-1220 Amber Monitors	106.00	1,696.00
1	LaserTen Printer	2,784.65	2,784.65
16	Shipping (CPU & Monitors)	39.00	624.00
	Subtotal (Hardware)		65,271.43

Software

	Description	Unit Price	Total
32	Smartware Site License *	200.00	6,400.00
	Subtotal (Software)		6,400.00

* Site license is an estimate

Installation and Training

20	Hours of Installation & Training	35.00	700.00
	Subtotal (Installation & Training)		700.00
	Total System Implementation		72,371.43

APPENDIX H

Selected List of Publications for the Areas of
Office Automation/Telecommunication/Records Administration,
Ergonomics, and Administrative Management

AI EXPERT, 2443 Fillmore Street, Suite 500, San Francisco, CA 94115. Published monthly, subscription $42 U.S.

ADMINISTRATIVE MANAGEMENT, Dalton Communications, Inc., P.O. Box 1129, Dover, NJ 07801. Published monthly, subscription $30 U.S. and Canada.

BUSINESS COMPUTER DIGEST, 10076 Boca Entrada Blvd., P.O. Box 3007, Boca Raton, FL 33433. Monthly publication, subscription $88 U.S. and Canada.

BUSINESS COMPUTING, P.O. Box 815, Tulsa, OK 74101. Published monthly, subscription $24 U.S., $28 Canada.

* BUSINESS FACILITIES, P.O. Box 2060, Red Bank, NJ 07701. Published monthly, free to qualified individuals.

BUSINESS SOFTWARE, P.O. Box 27975, San Diego, CA 92128. Published monthly, subscription $25 U.S., $44 Canada.

BYTE, (Small Systems Journal), McGraw-Hill Publishing Co., Inc., P.O. Box 590, Martinsville, NJ 08836. Published monthly, subscription $21 U.S., $23 Canada.

COMMUNICATIONS WEEK, CMP Publications, Inc., 600 Community Drive, Manhassett, NY 11030. Published weekly, free to qualified readers, otherwise $65 U.S. and Canada.

COMPUTER DECISIONS, Hayden Publishing Co., Inc., P.O. Box 1418, Riverton, NJ 08077. Published 26 times a year, subscription $35 U.S. and Canada.

* COMPUTER TECHNOLOGY REVIEW, West World Productions Incorporated, 924 Westwood Blvd., Suite 650, Los Angeles, CA 90024-2910. Published 4 times per year, free to qualified individuals, otherwise $50 U.S., $80 Canada.

COMPUTERS & ELECTRONICS, Ziff-Davis Publishing Co., 34460 Wilshire Blvd., Los Angeles, CA 90010. Published monthly, $16.97 U.S., $23.97 Canada.

COMPUTERWORLD, 375 Cochituate Road, Box 880, Framingham, MA 01701-9985. Published weekly, $44 U.S., $110 Canada.

* CONCEPTS, Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851. Published quarterly, free to Wang WP/DP equipment users, otherwise $16 annual non-membership subscription.

* DATA BASE MONTHLY, Data Base Publications, Inc., P.O. Box 1173, Dover, NJ 07801. Published monthly, subscription $38 U.S. and Canada.

DATA COMMUNICATIONS, Mc-Graw-Hill, Box 544, Hightstown, NJ 08520. Published monthly, subscription $40 U.S., $45 Canada.

DATA MANAGEMENT, DPMA, 505 Busse Highway, Park Ridge, IL 60068-3191. Published monthly, subscription $16 U.S.

DATA TRAINING, Weigarten Publications, 38 Chauncy Street, Boston, MA 02111. Published monthly, subscription $24 U.S.

* DATAMATION, Technical Publishing Company 875 Third Avenue, New York, NY 10022. Published bi-monthly, free to qualified buyers, otherwise $50 U.S., $75 Canada.

* DEC PROFESSIONAL (THE), Professional Press, Inc., P.O. Box 362, Ambler, PA 19002-0362. Published monthly, free to qualified U.S. sites, $25 Canada.

* DIGITAL NEWS, Digital Equipment Corporation (DEC), 5 Speen Street, Framingham, MA 01701-9990. Free to qualified persons.

* DIGITAL REVIEW, Ziff-Davis Publishing Co., Fourth Floor, One Park Avenue, New York, NY 10016. Published bi-weekly, subscription $30 U.S., Canada, and Mexico.

* INFORMATION CENTER, Weingarten Publications, Inc., 38 Chauncy Street, Boston, MA 02111. Published monthly, free to qualified readers in the U.S., $20 Canada.

* INFORMATION MANAGEMENT, 101 Crossways Park West, Woodbury, NY 11797. Published monthly, free to qualified subscribers, otherwise $10 U.S., $24 Canada.

* INFORMATION PROCESSING, IBM, Information Systems Group, 1133 Westchester Avenue, White Plains, NY 10604. Published by IBM, free to customers served by the National Accounts Division of the IBM IS group.

* INFORMATION SYSTEMS NEWS, CMP Publications, 333 East Shore Road, Manhassett, NY 11030. Published bi-weekly, free to qualified management and professional personnel, otherwise $17.50 U.S. and Canada.

* INFORMATIONWEEK, 600 Community Drive, Manhasset, NY 11030. Published weekly, free to qualified management and personnel in the information systems industry, otherwise $65 U.S. and Canada.

* INFOSYSTEMS, Hitchcock Publishing Co., Hitchcock Building, P.O. Box 3007, Wheaton, IL 60189-9933. Published monthly--U.S. readers ask for a free subscription otherwise subscription rate is $65 U.S., $75 Canada.

INFOWORLD, P.O. Box 1018, Southeastern, PA 19398-9982. Published weekly, $39 U.S., $49.95 Canada.

* INTERFACE, Published by International Computing Corp., 915 River Street, Santa Cruz, CA 95060. Published quarterly, free to qualified persons, otherwise $10.

JOURNAL OF EDUCATION FOR BUSINESS, Heldref Publications, 4000 Albermarle Street, N.W. Washington, D.C. 20016. Published monthly October - May, subscription $35 U.S., $42 Canada.

JOURNAL OF INFORMATION SYSTEMS MANAGEMENT, Auerbach, 6560 North Park Drive, Pennsauken, NJ 08109. Published quarterly, subscription $60 U.S. and Canada.

JOURNAL OF MANAGEMENT INFORMATION SYSTEMS, M. E. Sharpe, Inc., 80 Business Park Drive, Armonk, NY 10504. Published quarterly, $35 individual--$75 institution.

JOURNAL OF MICROGRAPHICS, Association for Information and Image Management, 8719 Colesville Road, Silver Spring, MD 20910. Published monthly, free to members of NMA, otherwise $55 U.S.

JOURNAL OF SYSTEMS MANAGEMENT, 24587 Bagley Road, Cleveland, OH 44183. Published monthly, subscription $17 U.S., $20 Canada, and $8.75 members.

LAN, Local Area Network Magazine, 12 West 21 Street, New York, NY 10010. Published monthly, $48 U.S.--$18 limited period introductory offer.

MANAGEMENT WORLD, AMS Building, 2360 Maryland Road, Willow Grove, PA 19090. Published monthly, $18 per year to non-members of AMS. (U.S. and Canada)

* MICRO COMMUNICATIONS, Circulation Dept., 500 Howard Street, San Francisco, CA 94105. Published monthly, free to qualified personnel in the U.S., otherwise subscription $22 U.S., $28 Canada.

MICROCOMPUTING, Published by Wayne Green, Inc., 80 Pine Street, Peterborough, NH 03458. Published monthly, $25 a year.

* MICROFILM TECHNIQUES, 250 Fulton Avenue, Hempstead, NY 11550. Published bi-monthly, free.

* MINI-MICRO SYSTEMS, Cahners Publishing Co., Computer Center, P.O. Box 5591, Dever, CO 80217. Published monthly, free to qualified subscribers, otherwise $65 U.S., $75 Canada.

* MIS WEEK, Circulation Department, P.O. Box 2036, Mahopac, NY 10541. Published weekly, free to qualified individuals, otherwise $40 U.S., $75 Canada.

* MODERN OFFICE TECHNOLOGY, P.O. Box 95795, Cleveland, OH 44101. Published monthly, ask for a free subscription, otherwise, $40 U.S., $70 Canada.

* NETWORK WORLD, CW Communications, P.O. Box 1021, Southeastern PA 19389-9979. Published weekly, except for a single combined issue the last two weeks in December. Free to qualified individuals, otherwise annual subscription is $65 U.S., $110 Canada.

* OAST (Office Automation Systems & Technology), P.O. Box OAST, Winter Beach, FL 32971. Published monthly, free to qualified individuals.

* OFFICE (THE), Office Publications, Inc., Attention: Circulation Dept., P.O. Box 1231, Stamford, CT 06904. Monthly publication, free to qualified subscribers, otherwise $30 U.S., $60 Canada.

ONLINE ACCESS GUIDE, Online Access Publishing Group, Inc., 5616 W Cermak Road, Cicero,IL 60650. Published bi-monthly, subscription $24.95 U.S., $30.95 Canada.

OFFICE EQUIPMENT AND METHODS, Maclean Hunter Building, 777 Bay Street, Toronto, ON M5W 1A7. Published monthly, subscriptions $17 U.S., $15 Canada.

* OFFICE SYSTEMS 686, Office Systems Magazine, Inc., P.O. Box 1015, Southeastern, PA 19398. Published monthly, free to qualified recipients, otherwise $36 annual subscription fee.

OPA (THE OFFICE PRODUCTS ANALYST NEWSLETTER). Suite 1606, 150 Broadway, New York, NY 10038. Monthly newsletter, subscription $220 U.S., $235 Canada.

OUTPUT, Technical Publishing, 1301 S. Grove Avenue, Barrington, IL 60010. Published monthly, subscription $18 U.S. and Canada.

PATTY SEYBOLD'S NETWORK MONITOR (Newsletter Only), Office Computing Group, 148 State Street, Suite 612, Boston, MA 02109-9990. Published monthly, $595 U.S., $607 Canada.

PATTY SEYBOLD'S OFFICE SYSTEMS REPORT, Office Computing Group, 148 State Street, Suite 6112, Boston, MA 02109-9990. Published monthly, $295 U.S., $307 Canada.

PC MAGAZINE, P.O. Box 2445, Boulder, CO 80322. Published bi-weekly except in July and August (22 issues), $34.97 U.S., $49.97 Canada.

PC PRODUCTS, Cahners Publishing Co., 270 St. Paul Street, Denver, CO 80206. Published monthly, free to qualified individuals, otherwise $35 U.S., $40 Canada.

PC WEEK, Ziff-Davis Publishing Co., Circulation Dept., One Park Avenue, 4th Floor, New York, NY 10016. Published weekly except for a single combined issue at year-end. Subscription $120 U.S., $150 Canada.

PC WORLD, Subscription Department, P.O. Box 6700, Bergenfield, NJ 07621. Published monthly, subscription $23.75 U.S., $25 Canada.

PERSONAL COMPUTING, P.O. Box 2941, Boulder, CO 80321. Published monthly, $11.97 introductory subscription.

PORTABLE COMPUTING, Circulation Department, 500 Howard Street, San Francisco, CA 94105. Published monthly, suscription $22 U.S. and $28 Canada.

* PRINTOUT, Computer Magazine, P.O. Box 228, Sauk Rapids, MN 56379. Published bi-monthly, free to qualified individuals, otherwise $9 per year.

SECRETARY (THE), published by the Professional Secretaries International, 301 East Armour Blvd., Kansas City, MO 64111-1299. Published nine times a year, subscription $12 U.S. and Canada.

* SOFTWARE AGE, 2211 Forde Avenue, Madison, WI 53701. Monthly publication, free.

* SOFTWARE NEWS, Sentry Publishing Co., Circulation Department, P.O. Box 542, Winchester, MA 01890. Published monthly, free to qualified individuals, otherwise $40 U.A., $50 Canada.

* T.H.E. JOURNAL (TECHNOLOGICAL HORIZONS IN EDUCATION), Circulation Department, P.O. Box 15126, Santa Ana, CA 92705-0126. Published monthly, except July and December. Free to qualified individuals in U.S. and Canadian Educational Institutions and Training Departments, otherwise $29.

* TELECOMMUNICATIONS, 610 Washington Street, Dedham, MA 02026. Published monthly, free to qualified individuals, otherwise $36 U.S., $48 Canada.

* TELECOMMUNICATION PRODUCTS PLUS TECHNOLOGY, PennWell Publishing Co., 119 Russell Street, P.O. Box 1425, Littleton, MA 01460-1425. Published monthly, free to qualified individuals, otherwise $30 U.S., $50 Canada.

TELECONNECT, Telecom Library Inc., 12 West 21 Street, New York, NY 10010. Published monthly. Annual subscription $15 U.S., $55 Canada.

* TODAY'S OFFICE, 645 Stewart Avenue, Garden City, NY 11530. Published monthly, free to qualified officials, otherwise $30 U.S. and $35 Canada.

TRAINING, 731 Hennepin Avenue, Minneapolis, MN 55403. Published monthly, $28 U.S., $31 Canada.

TRAINING WORLD, Woodbury Communications, Inc., 80 North Broadway, Hicksville, NY 10801. Bi-monthly publication (except in September when an extra issue is published), subscription $15 per year.

* TYPEWORLD, Blum Publications, 15 Oakridge Circle, Wilmington, MA 01887. Published tri-weekly, free to qualified individuals, otherwise $20 U.S. and Canada.

* VIEWPOINT, IBM Corporation, General Systems Division, P.O. Box 2068, Atlanta, GA 30055. Published bi-monthly. Free to qualified individuals.

WORDS, Associations for Information Systems Professionals, 1015 North York Road, Willow Grove, PA 19090. Published bi-monthly. Subscription $18 per year to non-members of AISP in the U.S. and Canada.

* FREE

APPENDIX I

RESOURCE MATERIALS FOR ELECTRONIC MATH APPLICATIONS

Courseware: — Publisher:

An Administrative Secretary Simulation-Dallas Oil, Inc.-Narrative Cassette, 1985 — Southwestern Publishing
By: Jennings
Note: This cassette is designed to add realism to the simulation. Mrs. Jennings, the central figure in the Dallas Oil Office, presents information concerning the corporation's structure and procedures.

Appleworks--Integrated Applications for Microcomputers, 1987 — Southwestern Publishing
By: Clayton and Park

Basic Skills in Word Processing: The Universal Approach-Sound Filmstrips, 1987 — Southwestern Publishing
By: Universal Train Systems Co.
Note: Will help students develop competencies in basic text entry, locate, format and edit operations on any word processing system. In 25-30 hours, students acquire basic skills, reinforced through written activities and hands-on experience. The Guided Discovery Operations Manual permits students to apply generalized concepts to any system. Enrichment activities included may be used as supplementary exercises during the course or at the student's convenience after program completion.
Supplementary Materials: Activity Guide and Teacher's Manual

Business English/30, 1980 — Gregg Division McGraw-Hill Book Company
By: Colleen B. Kish

Business English and Communication, Sixth edition, 1984
by: Marie Stewart
Note: Presentation of basics of grammar, punctuation and style. Effective business correspondence, listening and speaking skills.

Business English Essentials, Sixth edition, 1980 — Gregg Division McGraw-Hill Book Company
By: Henderson and Voiles

Century 21 Typewriting, 1977 — Southwestern Publishing
By: Lessenberry, D. D., et. al.

Championship Typing Drills, 1979 — Gregg Division McGraw-Hill Book Company
By: Cortez Peters

College English and Communications, 1982 — Gregg Division, McGraw-Hill Book Company
By: Stewart and Zimmer

Communication Skills for the Processing of Words, 1981 — Southwestern Publishing
By: Rosanne Reiff

Dictionary of Word Processing — Glencoe Publishing Company
Note: Pocket-sized, 112 pages.

DoMore With IBM PC, 1987 — Houghton Mifflin Company
Note: Introduction to the IBM PC or PC/XT and DOS; how to use the keyboard; manage files; use over 24 DOS commands; troubleshoot; choose and use software for PC; keep PC in working order.

DoMore With Lotus 1-2-3 — Houghton Mifflin Company
Note: Intro to electronic spreadsheets; how to enter, save and print data; develop a worksheet; format dollar signs, decimals, commas, percents; look at two worksheets simultaneously; write memos and notes.

DoMore With Multiplan — Houghton Mifflin Company
Note: Intro to electronic spreadsheets; how to select, enter, and execute Multiplan commands and subcommands; enter data, save, retrieve, print worksheets; create models; change, duplicate and move cells; use advanced features.

DoMore With PFS:File and PFS:Report — Houghton Mifflin Company
Note: Intro to forms and files; how to create and print a file; add, retrieve and update files; create and print a report, pull information and use it; sort alphabetically or numerically.

Effective Business Communication, 1985 — Southwestern Publishing
By: Burtness and Hulbert

Electronic Office and You: Word Processing Concepts, The, 1986 — Gregg Division, McGraw-Hill Book Company
By: Popyk and Boyce

English Made Easy, Second edition, 1986 — Gregg Division, McGraw-Hill Book Company
By: Bernadine P. Branchaw

English the Easy Way, 1985 — Southwestern Publishing
By: Schachter and Clark

Fox Valley Kennels — Glencoe Publishing Company
By: June Postal
Supplementary Materials: Includes a 60-minute cassette containing office dictation, and a reproducible book of 126 pages.
Note: One-secretary office practice set emphasizes decision making skills, working independently, budgeting time, and using good judgment. Simple bookkeeping, customer relations, advertising design, business forms, letter writing, microcomputer research.

Gregg Reference Manual, The, Sixth edition, 1985 — Gregg Division, McGraw-Hill Book Company
By: William A. John
Supplementary materials: Worksheets and Key to Worksheets

Gregg Typing, Series Seven, 1982 — Gregg Division, McGraw-Hill Book Company
By: Lloyd, Alan et. al.

Harborside Medical Clinic, A Medical Typing Simulation, 1986 — Houghton Mifflin Company
By: Seraydarian
Supplementary Materials: Harborside Medical Clinic Text-workbook, Teacher's Manual and Transcription Tape.
Note: 15-20 hours of up-to-date medical typing training for beginning students. Practice includes medical forms, handwritten drafts, and other realistic documents.

Help with Proofreading, 1986 — Houghton Mifflin Company
By: Ellingson
Supplementary Materials: Text-workbook and Teacher's Manual.
Note: In-depth treatment includes topics such as checking grammar, checking punctuation, checking spelling and word choice, checking final copy and more.

Heritage Park Legal Associates, A Legal Typing Simulation, 1987 — Houghton Mifflin Company
By: Baynes and Tower
Supplementary Materials: Text-workbook, Teacher's Manual, Legal Transcription Tape.
Note: 15-20 hours of on-the-job training for beginners who learn legal terminology and procedures, practice making decisions and setting priorities. Optional activities for electronic equipment.

How: A Handbook for Office Workers, 1975 — Wadsworth Publishing
By: Clark and Clark

Informational Processing Concepts, Principles, and Procedures, 1985 — Southwestern Publishing
By: Clark and Lambrecht

Introduction to Word Processing — Business Educators
Supplementary Materials: 74-frame filmstrip, cassette, and teacher guide with transcript and discussion/test questions.
Note: Features specialized people, client procedures, and sophisticated equipment, all working together.

Junior WordPerfect for the IBM PC and Compatibles — Community Computer Center
Note: Written especially for the young user and the new user, and runs on the IBM PC, PC/XT, AT, and PCjr. Junior WordPerfect's files are compatible with the regular version of WordPerfect. It requires 138 Kb and 1 disk drive.

Know Your Word Processing Vocabulary — Glencoe Publishing Company
Supplementary Materials: Student Workbook, 64 pages.
Note: Reinforces your students' word processing vocabulary.

Legal Word Book, The, Second edition — Houghton Mifflin Company
Note: This new edition features a quick reference guide to the spelling and division of 20,000 legal terms, a concise guide to legal citations, directories of legal and government agencies, and more.

Leisuretronics: A Statistical Typing Practice Set, 1985 — Gregg Division McGraw-Hill Book Company
By: Georgia L. Weathers
From: Opportunities for Learning, Inc., 20417 Nordhoff Street, Department 18, Chatworth, CA 91311.
Supplementary Materials: Text-workbook, 168 pages; Teacher's Manual and Key.
Note: 20-hour job set. This company has software available for writing, reading, spelling and grammar, and word processing and keyboarding skills. Made for the Apple, Commodore 64 and IBMs.

Letter Formatting, 1986 — Southwestern Publishing
By: Crawford, Erickson, Beaumont, Robinson, Ownby
Note: This user's guide features microcomputer keyboarding/formatting applications.

Machine Transcription Word Processing for Word Processors, Microcomputers, and Typewriters 1987, Second edition. — Southwestern Publishing
Supplementary Materials: 12 cassettes to be used with the text-workbook.
Note: Set is composed of 10 cassettes containing 20 jobs and 2 cassettes for testing purposes. Each job consists of approximately 15 minutes to typical business dictation to be transcribed. Dictation is given at an average of 80 WAM. Testing cassettes contain 4 tests, 1 to be given after each 5-lesson segment.

Medical Secretary, Pediatric Associates - An Office Job Simulation, The, 1987, Second ed. — Southwestern Publishing
Note: 2 dictation/transcription cassettes. Gives students an opportunity to take medical dictation or to transcribe materials contained in the simulation.

Mercury Systems, Inc: Practice Set in Work/Information Processing, 1986, Second edition. — Gregg Division McGraw-Hill Book Company
By: Betty L. Boyce
Supplementary Materials: Teacher's Manual and Key.
Note: Practice set combines an emphasis on keyboarding skills with fundamental word processing functions and applications. Can be used with typewriters, word processors, or micros. There are 18 jobs involving basic word processing machine operations and information on office automation and good work habits, proofreading and vocabulary skills.

Microcomputer Keyboarding/ Formatting Applications--Report Formatting, Letter Formatting, and Table Formatting, 1986. — Southwestern Publishing
By: Crawford, T. James, et. al.

Multimate — Houghton Mifflin Company
Note: User-friendly, system requirements: PC, DOS 1:1; PC XT, DOS 2.0; 256K, two diskette drives or one diskette drive and one fixed disk drive.

Professional's Secretary Handbook, A Guide to the Electronic and Conventional Office, The — Houghton Mifflin Company
Note: A comprehensive and up-to-date guide for the office of the 80s and beyond. Complete coverage of computers and automation.

Pro-Grammar/Pro-Sentence, 1986 — Southwestern Publishing
By: Joyce Powers

Programmed Proofreading, 1982 — Southwestern Publishing
By: Daniels and Dewar

Programmed Spelling Demons, 1985, Second edition. — Southwestern Publishing
By: George W. Feinstein

Punctuation: A Programmed Approach, 1982 — Southwestern Publishing
By: W. E. Perkins

Report Typing, 1980 — Southwestern Publishing
By: George P. Grill

Spelling--A Mnemonics Approach, 1985, Second edition — Southwestern Publishing
By: Alvin R. Brown

Spreadsheets — Southwestern Publishing
By: Close and Hite
Supplementary Materials: Apple Text-workbook and Template Diskette, Apple II, II Plus, IIe and IIc. IBM Text-workbook and Template Diskette, IBM PC. Instructor's Manual and Key, 32 pages.
Note: Text-workbook/software package which allows students to become acquainted with Visi Calc, and using the micro to solve the problems. A diskette containing common business applications preformatted into templates for solving on the Visi Calc spreadsheet program.

Transparencies for Introduction to Informaton Processing, 1985, Third edition — Southwestern Publishing
By: Sjoholm and Repulski
Supplementary Materials: 50 Transparencies, teacher's manual.
Note: Set is designed to accompany Southwestern's text, Information Processing: Concepts, Principles, and Procedures. Can be arranged to fit any course outline.

20,000 + Words: Spelled and Divided for Quick Reference, 1986, Eighth edition — Gregg Division, McGraw-Hill Book Company
By: Zoubek, Gordon, and Peslie

Typewriting: A Mastery Approach: Advanced Course, 1978 — Science Research Associates
By: Mach, Mitchell, LaBarre

Typing Mailable Letters, 1978 — Gregg Division, McGraw-Hill Book Company
By: Liles, Parker, et. al.

Word Book, The — Glencoe Publishing Company
Note: Spelling and division.

Word Processing — IBM Corporation, Office Products Division

Word Processing — Glencoe Publishing Company
by: Maranee Leirn-Cohen
Supplementary Materials: Student text, workbook. Instructor's manual and key, 64 pages.
Note: Gives students in-depth knowledge of word processing concepts plus marketable hands-on equipment skills.

Word Processing and Information Systems, 1983 — Gregg Division, McGraw-Hill Book Company
By: Marilyn K. Popyk

Word Processing and the Changing Office Environment-Sound Filmstrips, 1985 — Southwestern Publishing
By: Saffer
Supplementary Materials: 6 filmstrips and cassettes and an activities and projects guide. Teacher's manual.
Note: 12-15 class hours. Package of sound filmstrips and activities introduces students to the use of word processing, without the need for word processing equipment. Students learn technical concepts about word processing and gain familiarity with procedures and equipment.

Word Processing Specialist, Info-Tec-Office Job Simulation, The, 1985, Second edition. — Southwestern Publishing
Note: This supplementary cassette contains 12 dictated items of correspondence taken from selected jobs in the simulation.

Word Processing World — 51 Madison Avenue, New York, NY 10010

Word/Information Processing: Essential Concepts, 1986, Second edition. — Gregg Division, McGraw-Hill Book Company
By: Marilyn K. Popyk
Supplementary Materials: Instructor's Course Management Guide, Test Bank.
Note: 30-hour word processing concepts courses. Includes the information processing cycle, word processing equipment, office organization.

Word Processing Applications in Practice, 1984 — Southwestern Publishing
by: Meroney
Supplementary Materials: Text-workbook, teacher's manual.
Note: Students will set up actual business documents, keyboarding from rough-draft copy and interpreting proofreader's marks. Each lesson reinforces recognition of terms and proofreader's marks introduced at the beginning of the text-workbook.

WordPerfect — Houghton Mifflin Company
Note: Includes merge and spelling checker functions. System requirements: PC, DOS 1.1, two diskette drives; PC XT, DOS 2.0, 2.1; 128K.

WordPerfect Classroom Packages for the IBM PC and Compatibles — Community Computer Center
Supplementary Materials: A. 1 WP package, 1 instructor's workbook, 10 templates/labels, disk with 15 copies (5 backups). B. 1 WP package, 1 instructor's workbook, 20 templates/labels, disk with 30 copies (2 sets; 10 backups). C. 1 WP package, 1 instructor's manual, 30 templates/labels, disks with 45 copies (3 sets; 15 backups).
Note: A classroom version of WordPerfect. A school must formally teach WordPerfect as a credit course in order to qualify for purchase of the training versions of WordPerfect.

WordPerfect for the Apple IIe and IIc — Community Computer Center
Note: WordPerfect Corporation has created a version of WordPerfect for the Applie IIe and IIc with most of the features of the IBM PC version, including footnotes, headers and footers, merge and macros.

WordPerfect for the IBM PC and Compatibles — Community Computer Center
Note: Includes the Speller, Thesaurus, Outline, Mail-Merge, Math functions, and much more. Administrative Version and Training Version.

WordStar 2000 and WordStar 2000 Plus — Houghton Mifflin Company
Note: Featuring windows. System requirements: PC, DOS 2.0, 2.1., 3.0;, PC XT, DOS 2.1, 3.0; PC AT, DOS 3.0; 256K, two diskette drives or one diskette drive and one fixed disk drive.

Workplace Guidelines for VDTs, August 1985. — State of Washington Dept. of Labor & Industries
Note: Helps you understand and reduce health risks associated with Video Display Terminal. (Free)

Resource Listing Addresses:

Business Educators
P.O. Box 20142
San Jose, CA 95160
(408) 268-2394

Community Computer Center
East 330 Main
Pullman, WA 99163
(509) 332-1944 (direct)
1-800-521-7012, ext. 621
(toll free)

Glencoe Publishing Company
17337 Venture Boulevard
Evano, CA 91316
(818) 990-3080

Gregg Division
McGraw-Hill Book Company
Western Regional Office
8171 Redwood Highway
Novato, CA 94947
(415) 897-5295/5296

Houghton Mifflin Company
Pacific Region Office
777 California Avenue
Palo Alto, CA 94304
(415) 857-0211

IBM
Office Products Division
P.O. Box 1830
Seattle, WA 98111
(206) 587-6780

Science Research Associates
155 North Wacker Driver
Chicago, IL 60606
1-800-227-8429

Southwestern Publishing
855 California Avenue
Palo Alto, CA 94304
(415) 857-0556

Wadsworth Publishing Co.
Belmont, CA 94002

Washington, State of
Dept. of Labor & Industries
Industrial Hygiene Section
AX-31hy
P.O. Box 207
Olympia, WA 98504

Word Processing World
51 Madison Avenue
New York, NY 10010